

Contents

Acronym List.....	iv
Executive Summary.....	ES-1
1. Background and Project Description.....	1-1
1.1 Background.....	1-1
1.2 Project Description.....	1-2
2. Purpose and Need	2-1
2.1 Population Growth	2-1
2.2 Water Demand Projections.....	2-1
2.3 WWTP Capacities and Flow Projections	2-3
2.4 IBT Calculation.....	2-4
3. Existing Environment and Environmental Consequences.....	3-1
3.1 Source Basin.....	3-1
3.1.1 Wetlands	3-1
3.1.2 Land Use	3-3
3.1.3 Fish and Wildlife Resources.....	3-11
3.1.4 Water Resources / Water Quality	3-14
3.1.5 Air Quality.....	3-19
3.1.6 Groundwater Resources	3-20
3.1.7 Noise Level	3-21
3.1.8 Toxic Substances/Hazardous Wastes.....	3-22
3.2 Receiving Basin	3-22
3.2.1 Wetlands	3-23
3.2.2 Land Use	3-24
3.2.3 Fish and Wildlife Resources.....	3-28
3.2.4 Water Quality / Water Resources	3-30
3.2.5 Air Quality.....	3-32
3.2.6 Groundwater Resources	3-33
3.2.7 Noise Level	3-34
3.2.8 Toxic Substances/Hazardous Wastes.....	3-34
4. Secondary and Cumulative Impacts in the Receiving Basin	4-1
4.1 Secondary Impacts.....	4-1
4.1.1 Installation of Water and Sewer Lines.....	4-1
4.1.2 Build-out of the Receiving Basin	4-2
4.2 Cumulative Impacts	4-7
5. Alternatives Analysis	5-1
5.1 No Action Alternative	5-1
5.2 Obtain Water from Rocky River Subbasin Alternative	5-2
5.3 Discharge Water to Catawba River Subbasin Alternative	5-2
6. Mitigation of Adverse Impacts.....	6-1
6.1 Summary of Federal and State Regulations and Programs	6-1
6.1.1 Federal Regulations.....	6-2
6.1.2 State Regulations.....	6-4
6.2 Evaluation of Local Regulations and Programs	6-8
6.2.1 Mecklenburg County	6-8
6.2.2 North Mecklenburg Towns.....	6-27

6.2.3	Town of Mint Hill.....	6-30
6.3	Proposed Mitigation Measures.....	6-32
6.3.1	Water and Sewer Line EA/EIS Conditions.....	6-32
6.3.2	Enhancing and Strengthening Local Government Regulations & Programs.....	6-33
7.	Agency Involvement.....	7-1
8.	References.....	8-1

Figures

1	Project Study Area Map.....	1-3
2	Water Supply Service Area.....	1-5
3	Wastewater Service Area.....	1-6
4	Land Cover Map/Land Use Map.....	3-6
5	Water Quality/Water Resources Map.....	3-16

Tables

1	Areas of Potential Impacts to be Addressed by Permitting & NCEPA Processes for Identified Projects in the Source and Receiving Basins.....	ES-2
2	Characteristics of Lake Norman, Mountain Island Lake, and Lake Wylie.....	1-1
3	Projected Mecklenburg County Population and Population Served by CMUD.....	2-1
4	CMUD Raw Water Demand Projections.....	2-2
5	WWTP Capacities and Loadings.....	2-3
6	WWTP Average Daily Flow Projections (mgd).....	2-3
7	Interbasin Transfer Water Balance Table (Maximum Day Basis).....	2-5
8	Maximum Day Water Use, Discharge, and Interbasin Transfer (mgd) for CMUD Alternatives in 2030.....	5-1
9	Summary of Staff Resources Committed to the Voices and Choices Process.....	6-13
10	Key Elements for the City of Charlotte Stormwater Program.....	6-21
11	County Stormwater Program Elements.....	6-23
12	County Surface Water Program Elements.....	6-23
13	SWIM Phase I Elements.....	6-23
14	Summary of Existing Programs from Section 6.2 and the Environmental Resources They Protect.....	6-31
15	Impact Proposed IBT Conditions on Environmental Secondary Impacts.....	6-34
16	Mitigation Monitoring Plan.....	6-35

Appendices

- A Supporting Tables
- B Resource Agencies Consultation
- C Proposed Land Use Maps
- D Charlotte-Mecklenburg Environmental Programs Supporting Documentation

Acronym List

ACOE	U.S. Army Corps of Engineers
ADD	average daily demand
AQI	Air Quality Index
BFE	base flood elevation
BMP	best management practice
CGIA	North Carolina Center for Geographical Information and Analysis
CMUD	Charlotte-Mecklenburg Utilities Department
COG	Council of Government
CWMTF	North Carolina Clean Water Management Trust Fund
DENR	North Carolina Department of Environment and Natural Resources
DWQ	North Carolina Division of Water Quality
DWR	North Carolina Division of Water Resources
EA	environmental assessment
EIS	environmental impact statement
EMC	North Carolina Environmental Management Commission
EPA	U.S. Environmental Protection Agency
FDA	U.S. Food and Drug Administration
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FONSI	finding of no significant impact
fps	feet per second
FY	fiscal year
GIS	geographic information system
gpcd	gallons per capita day
HHW	household hazardous waste
IBT	interbasin transfer
MCDEP	Mecklenburg County Department of Environmental Protection
MDD	maximum daily demand
mgd	million gallons per day
MOA	Memorandum of Agreement
MPL	Mecklenburg Priority List

MS4	municipal separate storm sewer system
NAAQS	National Ambient Air Quality Standard
NCDOT	North Carolina Department of Transportation
NCEPA	North Carolina Environmental Policy Act
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NHP	Natural Heritage Program
NO _x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NWI	National Wetlands Inventory
RRR	Rocky River Regional
SC DHEC	South Carolina Department of Health and Environmental Control
SNHA	Significant Natural Heritage Area
SSO	sanitary sewer overflow
SWAC	North Carolina Storm Water Advisory Committee
SWIM	Surface Water Improvement Management Program
TMDL	total maximum daily load
TPL	Trust for Public Land
TSD	treatment, storage, or disposal
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOC	volatile organic compound
WQI	water quality index
WRC	North Carolina Wildlife Resources Commission
WRP	North Carolina Wetlands Restoration Program
WSACC	Water and Sewer Authority of Cabarrus County
WTP	water treatment plant
WWTP	wastewater treatment plant

Executive Summary

The Charlotte-Mecklenburg Utilities Department (CMUD) is requesting an interbasin transfer (IBT) certificate from the North Carolina Environmental Management Commission (EMC) for an increase in their IBT from 16.1 million gallons per day (mgd) to 33 mgd. The proposed IBT is based on expansion of the existing water withdrawals from the source basin (Lake Norman and Mountain Island Lake within the Catawba River Subbasin), and transfer of the water to the receiving basin (Eastern Mecklenburg County within the Rocky River Subbasin) via consumptive use and existing discharges in the receiving basin (Mallard Creek Wastewater Treatment Plant [WWTP] and Water and Sewer Authority of Cabarrus County's [WSACC] Rocky River Regional WWTP). The IBT will not lead to expansions to either of these existing WWTP discharges in the receiving basin. This Environmental Assessment (EA) provides supporting documentation for the IBT certificate application.

The project area for the EA consists of the following areas:

- Catawba River Subbasin (source basin): Lake Norman, Mountain Island Lake, Lake Wylie, and the Catawba River from Lake Norman to the Wylie Dam.
- Rocky River Subbasin (receiving basin): The Mecklenburg County portion east of the ridge line with the exception of the Goose Creek watershed. The study area includes Mallard Creek from the WWTP discharge point downstream to the confluence of the Rocky River proceeding along the Rocky River to the intersection with NC 205.

The IBT associated with future water service into the Goose Creek watershed in Mecklenburg County is being addressed in a separate State Environmental Policy Act (NCEPA) document and is not addressed in this EA. Thus, no portion of Goose Creek is within the study area. The requested IBT of 33 mgd does not include transfers associated with the Goose Creek watershed. Removing Goose Creek from the study area was done in order to address comments received on the project (Appendix B).

The purpose of the EA is to evaluate the direct, indirect, and cumulative impacts of the proposed IBT on both the source and receiving basins. Included is an analysis of potential impacts on: wetlands, urban lands, prime agricultural lands, forestry resources, public and recreational lands, archaeological and historical resources, fish and wildlife resources, sensitive aquatic and terrestrial species and habitats, water quality and water resources, air quality, groundwater, noise, and toxic substances.

The report concludes that the direct impacts of the IBT on both the source and receiving basins would be insignificant. The project will not significantly change lake elevations, minimum dam releases, surface water hydrology, or water quality in the source or receiving basins.

Secondary and cumulative environmental impacts of future buildout of the portion of the receiving basin in the project area are evaluated in this EA. Although these impacts may be potentially significant (due to the possibility that the IBT will facilitate growth and development in eastern Mecklenburg County through the eventual provision of water and

sewer services to the region), the implementation of the various mitigation measures presented in the EA reduces these impacts to a level of insignificance.

The EA for the proposed IBT focuses on the movement of water from one basin to another. Although the EA recognizes potential indirect impacts of the proposed action, the document does not evaluate specific water treatment, wastewater treatment, and pipeline facilities. These future facilities will be evaluated under the NCEPA when they are planned and designed (see Table 1).

TABLE 1
Areas of Potential Impacts to be Addressed by Permitting & NCEPA Processes for Identified Projects in the Source and Receiving Basins

Environmental Resource	Source Basin			Receiving Basin		
	Proposed CMUD IBT	Future WTP Expansions	Water Line Extensions	Proposed CMUD IBT	Sewer Line Extensions	Water Line Extensions
Wetlands	PI	LI	PI	LI	PI	PI
Urban / Developed Land	LI	PI	PI	LI	PI	PI
Public Land / Recreation Uses	PI	PI	PI	LI	PI	PI
Prime Agricultural Land	LI	LI	PI	LI	PI	PI
Forestry Land	LI	PI	PI	LI	PI	PI
Archaeological / Historical Areas	LI	PI	PI	LI	PI	PI
Wildlife Habitat	PI	PI	PI	LI	PI	PI
Fisheries and Aquatic Resources	PI	PI	PI	LI	PI	PI
Sensitive and Threatened Species & Habitat	PI	PI	PI	LI	PI	PI
Water Resources	PI	PI	PI	LI	PI	PI
Water Quality	PI	PI	PI	LI	PI	PI
Air Quality	LI	PI	PI	LI	PI	PI
Groundwater	LI	LI	LI	LI	PI	LI
Noise	LI	PI	PI	LI	PI	PI
Toxic & Hazardous Substances	LI	PI	LI	LI	PI	LI
Secondary Growth (with impacts to environmental resources)	LI	PI	PI	PI	PI	PI

Notes:

CMUD IBT = Charlotte-Mecklenburg Utilities Department Interbasin Transfer
NCEPA = North Carolina Environmental Policy Act

PI = Areas of Potential Impact (major relevance in NCEPA documents and permitting applications)

LI = Areas of Limited Impact (minor relevance in NCEPA documents and permitting applications)

This table is meant to show the relevance of each of the environmental issues for each particular project. **“PI” indicates areas where there is a potential for impacts to occur as a direct consequence of the project.** This table is not meant to conclude the significance of the impacts of each project on these environmental resources. The individual NCEPA documents prepared for each of these projects will address whether or not these impacts will be significant. Rocky River Regional and Mallard Creek WWTPs will not require expansions to their NPDES permits as a result of the IBT.

SECTION 1

Background and Project Description

1.1 Background

Lake Norman, Mountain Island Lake, and Lake Wylie, which are part of the Catawba River basin and are located partially in Mecklenburg County, are the final three lakes in a series of seven hydropower impoundments along the Catawba River in North Carolina. The impoundments are owned by Duke Power. Mountain Island Lake and Lake Wylie were built between 1904 and 1928, and Lake Norman was completed in 1967. All three lakes are extensively used for power generation and recreation, as well as water supply. Table 2 summarizes the lake characteristics.

TABLE 2
Characteristics of Lake Norman, Mountain Island Lake, and Lake Wylie

Characteristic	Lake Norman	Mountain Island Lake	Lake Wylie
Year Completed	1967	1923	1904-1928
Drainage Area (sq. miles)	1793	1860	3020
Average Depth (feet)	34	16	23
Maximum Depth (feet)	120	30	92
Shoreline Length (miles)	520	61	330
Surface Area (sq. miles)	51	5	19
Volume (billion gallons)	356.1	18.7	90.5

Lake Norman is the largest and most upstream of three reservoirs on the Catawba River in Mecklenburg County and was used as the water supply source for the towns of Davidson, Huntersville, and Mooresville. It recently became a source for the Charlotte-Mecklenburg Utilities Department (CMUD—a City of Charlotte Department), which supplies the City of Charlotte and most of Mecklenburg County.

Mountain Island Lake is the smallest of the three reservoirs and is fed by releases from Lake Norman. It was the only water supply source for the City of Charlotte through CMUD until the recent completion of the intake from Lake Norman; however, Mountain Island Lake is still the main CMUD water supply source. Lake Wylie is the southernmost lake in Mecklenburg County, forming the boundary to York County, South Carolina, and is the water supply source for the City of Rock Hill, South Carolina.

There are three water treatment plants (WTPs) that supply Mecklenburg County with potable water: Franklin, Vest, and North Mecklenburg. Due to continued growth and new facilities (i.e., the new intake and North Mecklenburg WTP and the expansion of the Franklin WTP), water withdrawal has or will increase from Lake Norman and Mountain Island Lake in the Catawba River Basin.

Four out of five of CMUD's wastewater treatment plants (WWTPs) discharge back into the Catawba River Basin. The fifth, CMUD's Mallard Creek WWTP, is located in northeast Mecklenburg County and discharges to Mallard Creek in the Yadkin-Pee Dee River Basin. Additional CMUD wastewater is treated at the Cabarrus County's Rocky River Regional (RRR) WWTP, which discharges to the Rocky River. Both of these WWTPs discharge into the Rocky River Subbasin in the Yadkin-Pee Dee River Basin. The locations of the WWTPs are shown on the map of the study area (see Figure 1).

Water use in CMUD's service area, including the portion in the Rocky River Subbasin, is increasing. As water use in the Rocky River Subbasin increases, CMUD has recently increased its use of wastewater treatment facilities in that basin by transferring flows to the RRR WWTP and expanding the Mallard Creek WWTP. The additional use and discharge of water in the Rocky River Subbasin (through existing permitted capacities) will result in an increase in CMUD's interbasin transfer (IBT) from the Catawba River Subbasin to the Rocky River Subbasin.

1.2 Project Description

An IBT certificate from the North Carolina Environmental Management Commission (EMC) is required once the amount of water transferred from one subbasin to another reaches the full capacity of the transfer facilities that were existing or under construction as of July 1, 1993 (referred to as the *grandfathered capacity*). Since CMUD has exceeded 80 percent of its grandfathered IBT capacity of 16.1 million gallons per day (mgd), CMUD has begun the application process to increase its IBT to 33 mgd (based on 2030 needs) by obtaining an IBT certificate. This Environmental Assessment (EA) provides supporting documentation for the IBT certificate application for the study area designated as the following "source" and "receiving" basins as shown in Figure 1:

- Catawba River Subbasin (source basin): Lake Norman, Mountain Island Lake, Lake Wylie, and the Catawba River from Lake Norman to the Wylie Dam.
- Rocky River Subbasin (receiving basin): The Mecklenburg County portion east of the ridge line with the exception of the Goose Creek watershed. The study area includes Mallard Creek from the WWTP discharge point downstream to the confluence of the Rocky River proceeding along the Rocky River to the intersection with NC 205.

The boundary of the study area around water bodies is offset 0.5 mile from the shoreline to incorporate flood plain areas as shown on digital Federal Emergency Management Agency (FEMA) flood zone maps.

The IBT associated with future water service into the Goose Creek watershed in Mecklenburg County is being addressed in a separate NCEPA document and is not addressed in this EA. Thus, the entire Goose Creek watershed is outside the study area of this project. The requested IBT of 33 mgd does not include transfers associated with the Goose Creek watershed. Removing Goose Creek from the study area was done in order to address comments received on the project (Appendix B).

CMUD's current water supply system serves approximately 95 percent of Mecklenburg County with plans to supply 100 percent by 2020. There are connections to Union, Cabarrus,

INSERT FIGURE 1

and York (South Carolina) Counties; however, these connections are currently used for emergency supply only. The distribution system is divided into three service areas, referred to by the water pressure in each area (i.e. 882 feet = area 882). The Franklin and Vest WTPs treat raw water from Mountain Island Lake and supply areas 882 and 960. The North Mecklenburg WTP treats raw water from Lake Norman, and is the primary supply for area 978. Approximately 70 percent of Mecklenburg County is in the Catawba Basin, while the remaining 30 percent is in the Yadkin-Pee Dee Basin; therefore, a portion of the water that is withdrawn from the Catawba Basin is actually supplied to residents of Mecklenburg County in the Yadkin-Pee Dee Basin as shown in Figure 2.

Some of the water that is supplied from the Catawba Basin to the Yadkin-Pee Dee Basin in Mecklenburg County remains in the Yadkin-Pee Dee Basin due to consumptive uses such as irrigation and septic systems. The remainder of this water is directly discharged to the Rocky River Subbasin as treated wastewater from the Mallard Creek WWTP and the RRR WWTP, and eventually may be returned to the Catawba Basin via the McAlpine WWTP unless a proposed facility is built in the Rocky River Subbasin. The Rocky River Regional WWTP primarily serves Cabarrus County but also receives some Mecklenburg County flows under a contractual agreement with the Water and Sewer Authority of Cabarrus County (WSACC). The Mallard Creek WWTP serves only Mecklenburg County customers. The Mecklenburg County portion of the service areas for these plants in the receiving basin can be seen in Figure 3.

The greater Charlotte metropolitan region has enjoyed a healthy economy for most of this century, resulting in steady population growth and economic development. Based on land use projections, it is predicted that similar growth patterns will continue and will increase the demand for water and wastewater services. Population, water demand, and wastewater flow projections are presented in Section 2. The IBT associated with the increased withdrawal from the Catawba River Subbasin and the increasing flows to the Rocky River Subbasin is expected to be 32.8 mgd maximum day in 2030. This IBT amount does not include transfers associated with the Goose Creek watershed. The requested amount of 33 mgd allows some contingency to account for uncertainty in population growth and water demand projections.

The existing conditions and environmental consequences of the proposed IBT are presented in Section 3. Secondary impacts for the receiving basin are contained in Section 4. The alternatives are discussed in Section 5, and the mitigation of any areas of concern is discussed in Section 6.

Figure 2

Figure 3

SECTION 2

Purpose and Need

2.1 Population Growth

The Mecklenburg County population projections presented in Table 3 are based largely on Charlotte Chamber of Commerce projections through 2010. While these projections are slightly higher than projections by others, past Chamber estimates have most accurately matched recent population levels. Projections beyond 2010 more closely match long-term projections by the Mecklenburg County Planning Commission. Starting with 1997 U.S. Census data, the projections represent about a 2.6 percent annual increase through 2010, decreasing to 1.3 percent in 2030. It is also assumed that 100 percent of the County population will be served by CMUD by 2020 (the population within the Goose Creek watershed is included in these projections even though IBT associated with this area is not the subject of this EA).

TABLE 3
Projected Mecklenburg County Population and Population Served by CMUD

Year	Projected Mecklenburg County Population	Percent Served	Population Served
1997	613,310	95%	584,000
2000	662,000	96%	636,000
2010	830,000	98%	813,000
2020	968,000	100%	968,000
2030	1,101,000	100%	1,101,000

Source: Charlotte Chamber of Commerce projections through 2010, transitioned to Mecklenburg County Planning Commission projections in 2030.

Completion of the I-485 loop around Charlotte is expected to spur growth in the northeast region of Mecklenburg County. This will increase the percentage of CMUD customers in the Rocky River Subbasin from the current 16 percent to about 28 percent in 2030.

2.2 Water Demand Projections

The CMUD raw water demand projections presented in Table 4 are based on population projections. The projections take into account added residential and nonresidential customers, as well as regular bulk sales to the Carowinds amusement park. The following assumptions were used in calculating demand projections:

- Existing users are assumed to continue using water at their current rate.
- A rate of 115 gallons per capita day (gpcd) was used for future residential and small commercial customers. Water use for the largest 50 water users was estimated separately. Based on the preliminary report for the Pitometer Water Distribution Study (1999), this is 8.5% higher than 1997 billing records (106 gpcd), but lower than

production records (146 gpcd). The reduction in usage rate for future residential and small commercial customers should account for a combination of existing system leak detection, and lower losses in the portions of the system serving new customers.

- The existing use of large customers will continue at 9.14 mgd.
- New industry use will increase from 0 in 1997 to 7 mgd by 2030.
- The only new wholesale customer anticipated by CMUD is Carowinds, with a demand of 0.50 mgd starting in 2000.
- Future maximum day to average annual demand ratio is 1.5. Raw water needs include 1.4 percent losses at water treatment plants based on historical averages.

TABLE 4
CMUD Raw Water Demand Projections

Year	ADD (mgd)	MDD (mgd)
2000	102.8	154.1
2010	125.9	188.8
2020	146.0	219.1
2030	163.5	245.2

Source: Based on population estimates from Table 3.

ADD = Average Daily Demand
MDD = Maximum Daily Demand
mgd = million gallons per day

The current capacity of the North Mecklenburg WTP is 18 mgd; however, the intake facility is permitted by the Federal Energy Regulatory Commission (FERC) for a maximum instantaneous withdrawal rate of 108 mgd from Lake Norman. There is no raw water storage at this facility. Franklin and Vest have capacities of 144 and 24 mgd, respectively, and the Mountain Island Lake intake facility has a FERC-permitted instantaneous withdrawal rate of 165 mgd. Raw water storage for these two plants totals 350 mgd. Taking into account pumping practices and raw water storage, the current combined FERC withdrawal permits for Lake Norman and Mountain Island Lake would allow CMUD to meet average annual demands of 145 mgd. CMUD has requested an increase from FERC in the Mountain Island Lake withdrawal from 165 mgd to 330 mgd (instantaneous maximum), primarily to add reliability and pumping flexibility, and to meet projected demands through 2030.

During a drought situation CMUD would follow its Water Shortage Response Plan, which includes either voluntary or mandatory conservation measures depending on the severity of the drought. This would reduce peak demands and the associated interbasin transfer; this reduction is not reflected in Table 4 above or in further analysis in this EA.

2.3 WWTP Capacities and Flow Projections

Table 5 lists the permitted capacities, average annual discharge, daily loading rates for specific pollutants, and proposed expanded capacities of pertinent wastewater treatment plants.

TABLE 5
WWTP Capacities and Loadings

WWTP Name	Discharge Subbasin	Permitted Capacity (mgd)	1998 Average Annual Discharge (mgd)	1998 Daily Average Loading Rate for BOD ₅ (lbs/d)	1998 Daily Average Loading Rate for NH ₃ -N (lbs/d)	Expected 2030 Capacity: Maximum Month (mgd)
Source Basin						
Irwin Creek	Catawba	15.0	8.88	446.0	21.5	15.0
Sugar Creek	Catawba	20.0	14.64	326.0	80.6	20.0
McAlpine Creek	Catawba	64.0	40.48	942.0 ¹	195.8	128.0
McDowell Creek	Catawba	6.0	2.89	64.0	5.3	12.0
Receiving Basin						
Mallard Creek	Rocky River	12.0	5.09	121.0	30.3	12.0
Rocky River Regional ²	Rocky River	0.0	0.0	-	-	6.0

Notes:

¹ CBOD

² CMUD contracted amount is currently at 3.0 mgd, to begin in 2000, with an option to expand to 6 mgd.

The wastewater flow projections shown in Table 6 were used to calculate the proposed IBT amount. These projections do not include wastewater flows for the Goose Creek watershed. The calculation analysis assumes that no increase in the permitted wastewater capacities in the receiving basin will result due to the IBT.

TABLE 6
WWTP Average Daily Flow Projections (mgd)¹

Year	Irwin Creek	Sugar Creek	McAlpine Creek	McDowell Creek	Mallard Creek	Rocky River Regional ¹	Total WWTP Flow
2000	10.5	14.7	45.8	4.5	6.2	0	81.70
2010	12.0	16.0	56.0	8.0	7.7	3.3	103.0
2020	12.0	16.0	70.0	10.0	9.6	3.9	121.5
2030	12.0	16.0	78.0	14.0	9.6	4.5	134.4

Note:

¹ Proposed CMUD portion of flows that will be sent to the WWTP

In an effort to minimize discharges to surface water, decrease use of potable water for non-potable uses, and to use treated wastewater as a valuable resource, CMUD has been aggressively pursuing opportunities for water reuse. At the Mallard Creek water reclamation facility, CMUD is permitted to reuse up to 3 mgd of reclaimed water (treated wastewater) for irrigation purposes. This was the first facility permitted for conjunctive use (i.e., both discharge and reuse) of reclaimed water under revised rules for water reclamation developed by the North Carolina Division of Water Quality (DWQ) in 1996. CMUD is continuing to promote opportunities for reuse, which reduce peak demands for potable water and reduce discharge to surface waters.

In addition to water reuse, CMUD has instituted water conservation measures and a full Water Conservation Plan that will be put into effect in the spring of 2000. Potential elements of the plan include:

- Use of water conservation devices in new buildings
- Limits on irrigation (number of days per week)

The plan will focus more on education and incentives rather than enforcement of ordinances. The plan envisions that the financial benefits to both commercial and private users for conserving water may become more attractive.

2.4 IBT Calculation

Based on the water demand projections for the Catawba River Subbasin and the estimated wastewater discharge to the Rocky River Subbasin, the IBT calculation is presented in Table 7. The following assumptions apply:

- Customer consumptive use includes in-basin water uses such as irrigation and septic systems and is assumed to be 22 percent of raw water withdrawal based on discussions with North Carolina Division of Water Resources (DWR) staff. WTP losses of 1.4 percent are included in total consumptive use estimates.
- In 2000, 85 percent of CMUD's water supply goes to users within the Catawba River Subbasin; this falls to 75 percent in 2030. The remaining water is supplied only to CMUD customers in the Mecklenburg County portion of the Rocky River Subbasin.

TABLE 7
Interbasin Transfer Water Balance Table (Maximum Day Basis)

Year	Water Withdrawal From Catawba Basin	Consumption		Estimated Wastewater Discharge ¹		Total Return to Catawba River Subbasin ²	Interbasin Transfer ³
		Catawba River Basin	Rocky River Basin	Catawba River Basin	Rocky River Basin		
2000	152.9	30.2	5.1	108.7	8.9	138.9	14.0
2010	184.3	34.4	8.1	126.5	15.2	161.0	23.3
2020	213.9	38.2	11.3	146.2	18.3	184.3	29.5
2030	239.4	42.2	13.1	164.4	19.7	206.6	32.8

Notes:

¹ Estimated wastewater discharge represents the amount of water withdrawal that is discharged as wastewater. It does not include the impacts of inflow and infiltration on actual wastewater discharge amounts.

² Total Return to Catawba River Subbasin = Catawba River Consumption + Catawba River Wastewater Discharge

³ Interbasin Transfer = Water Withdrawal from Catawba – Total Return to Catawba

In order to allow some contingency for uncertainty in projected population growth or water demands, the requested IBT is 33 mgd, an increase of about 1 percent over the calculated amount of 32.8 mgd. In order to minimize the transfer of water from one basin to another, the IBT calculation is based on the assumption that the permitted treatment capacity of existing wastewater treatment facilities in the receiving basin is not increased. As indicated previously, this IBT does not include transfers associated with water or wastewater service provided to the Goose Creek watershed in Mecklenburg County.

SECTION 3

Existing Environment and Environmental Consequences

This section pertaining to the existing environment for the IBT study area is divided into two sections:

- Section 3.1 - Source Basin, which describes the portion of the study area from which raw water is withdrawn, and
- Section 3.2 - Receiving Basin, which describes the portion of the study area where wastewater is discharged.

Each basin is further divided and described by the following potentially affected areas: wetlands, land use, fish and wildlife resources, water resources/water quality, air quality, groundwater resources, noise level, and toxic substances/hazardous waste. Environmental documents may be required to be prepared under the North Carolina Environmental Policy Act (NCEPA) if these areas are impacted due to a proposed action; therefore, these topics will require further discussion.

For Section 3.1 (Source Basin), the existing environment is described for each area studied, followed by a discussion of the primary and secondary/cumulative consequences, if any, on the area.

For Section 3.2 (Receiving Basin), the existing environment is described for each area studied, followed by a discussion of the primary consequences, if any, for the area. Secondary and cumulative impacts in the receiving basin are discussed in Section 4.

The data for both sections were gathered through literature reviews, internet searches, geographic information system (GIS) queries, phone conversations, letters, and meetings with various resource agencies.

3.1 Source Basin

The "source basin" is considered to be the portion of the study area that is within the Catawba River Subbasin. The source basin study area includes Lake Norman, Mountain Island Lake, Lake Wylie, and the Catawba River from Lake Norman to the Wylie Dam.

The boundary of the study area around water bodies is offset 0.5 mile from the shoreline to incorporate flood plain areas as shown on FEMA flood zone maps.

3.1.1 Wetlands

According to the U.S. Environmental Protection Agency (EPA), wetlands are lands in transition between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water at least part of the year. For regulatory purposes under the Clean Water Act, the term wetlands means "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to

support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas." In general, wetlands share three key characteristics: wetland hydrology, wetland soils, and wetland plants. Wetlands and vegetated riparian areas are valuable because they are biologically productive natural ecosystems in the world, protect wildlife and provide natural open spaces, protect water quality, control erosion, and prevent flooding damage.

3.1.1.1 Existing Environment

The source basin project area extends southward along the Catawba River from Lake Norman to Mountain Island Lake, and continues along the Catawba River to the Wylie Dam. The study area boundary extends 0.5 mile from the shoreline of the water bodies (see Figure 1). This western Piedmont physiographic province of the state is characterized by gently sloping to strongly sloping, well drained and moderately well drained soils that have a clayey or loamy subsoil (U.S. Department of Agriculture [USDA], 1980). Soils in the Lake Norman to Lake Wylie region consist of an association of Cecil-Hiwassee-Goldston-Badin series. Slope of the terrain averages 10 percent, with a range of 2 to 25 percent (South Carolina Department of Health and Environmental Control [SC DHEC], 1996).

Within the 132,498-acre source basin study area, 45,954 total acres of various types of wetlands have been identified by the National Wetlands Inventory (NWI) (as published by the U.S. Fish and Wildlife Service [USFWS], 1999) and shown on the Land Cover table in Appendix A (Table A-2). According to the GIS analysis of NWI maps for the service area, 322 acres of L2US3Gh wetlands were identified. These wetlands are present in a special "exposed draw down zone" around large impoundments. The GIS maps also identified 44,172 acres of L1UB3Hh special case wetlands, which occur around hydroelectric and water supply impoundments in the Piedmont. A wetland field delineation was not performed for the source basin due to the large study area.

The majority of the wetlands within the source basin project area identified on the NWI maps are of bottomland hardwood forests of the Palustrine Piedmont/ Low Alluvial Forest type (see North Carolina Natural Heritage Program [NHP] letter dated April 1999 in Appendix B). Other types of wetlands that are known to occur in the source basin are listed in the Wetland Types in the Source Basin table, located in Appendix A (Table A-1).

A few Significant Natural Heritage Areas (SNHAs) containing wetland natural communities have been identified by NHP to exist in proximity to the source basin within North Carolina. It is unknown if any SNHAs may exist in the South Carolina portion of the source basin (correspondence from SC only included listings of sensitive species, not SNHAs). A list of NC SNHA wetland sites that were identified as being within the adjacent U.S. Geological Survey (USGS) quadrangles that compose the North Carolina portion of the source basin project area is presented on page A-2 in Appendix A. In addition to those communities listed by NHP for the source basin, the North Carolina Wetlands Restoration Program (WRP) lists the Southern Appalachian Bog, Swamp-Forest Bog Complex, Spray Cliff, Rocky Bar and Shore, Montane Alluvial Forest, High Elevation Seep, and Upland Pool wetland community types as existing in the Catawba River Basin (WRP, 1998A).

3.1.1.2 Primary Impacts

As discussed in Section 3.1.4 of this EA, the proposed transfer does not require the construction of additional water intake structures in Mountain Island Lake. Any proposed pumping stations and conveyance lines associated with the transfer will be permitted separately under appropriate state and federal programs and their wetland and environmental impacts evaluated under a separate NCEPA or National Environmental Policy Act (NEPA) process.

As discussed further in the aquatic resources section of this EA, many of the rare plants in the Catawba River Basin grow in the wet soils of bogs and can be indirectly affected by water quality and quantity changes. Section 3.1.4 summarizes an analysis by Duke Power that indicated there will be no changes in the surface water elevations of Lake Norman, Mountain Island Lake, and Lake Wylie under normal and drought conditions due to the proposed increased interbasin transfer. Under extreme drought conditions (when Duke manages the lakes only to meet minimum release requirements) the surface water elevations upstream of the Mountain Island Dam are expected to decrease moderately, by approximately 0.3 inch per week. This moderate effect is not anticipated to be significant.

With no significant changes to lake elevation, basin hydrology, or water quality, the interbasin transfer project will not have any significant direct impact on wetlands or SNHA with wetland components within the source basin.

3.1.1.3 Secondary and Cumulative Consequences

“Cumulative Effects” are defined as “resulting from the incremental impact of the proposed activity when added to other past, present, and reasonably foreseeable future activities regardless of what entities undertake such other activities.”¹ “Indirect Effects” are “caused by and result from the proposed activity although they are later in time or further removed in distance, but they are still reasonably foreseeable.”²

The IBT will not affect the provision of water or sewer services in the source basin around Lake Norman, Mountain Island Lake, or Lake Wylie. The IBT will not change the existing pattern or rate of growth expected in the source basin. The IBT will therefore not have any secondary or cumulative impacts to wetlands in the source basin.

3.1.2 Land Use

3.1.2.1 Existing Environment

Urban / Developed Lands

Future planned land uses for the source basin are provided on the Proposed Land Use Maps in Appendix C. These maps were taken from each of the District Plans for Mecklenburg County. Since these land use maps are not available in GIS format, a GIS analysis of projected land uses in the source basin was not possible. The analysis of land uses as follows was therefore achieved through the use of land cover GIS, which show only existing land uses for the project area in 1996 for North Carolina and 1989-1990 for South Carolina.

¹ 15A NCAC 1C .0101(d)(2)

² 15A NCAC 1C .0101(d)(4)

All three of the lakes in the project area (Lake Norman, Mountain Island Lake, and Lake Wylie) are used for hydropower generation and as water supplies, and all are owned by Duke Power. All the lakes are heavily used for fishing, recreation, open space, and nature preserves. Table 2 (in Section 1) summarizes characteristics of the three lakes.

Since portions of all three lakes are classified as water supplies with a WS-IV classification, the majority of the 0.5-mile-wide area surrounding the lakes in the source basin project area is protected from non-point source pollution by local land use ordinances that limit development type and density, as required under the Water Supply Watershed Protection Act (G.S. 143-214.5). The only area that is not protected is a small area in North Carolina on the eastern edge of Lake Wylie, below the Paw Creek arm to the state line. This area is classified as WS-V, which does not require land use density or use restrictions. The WS-IV requirements limit development density to 2 dwelling units per acre (or 24 percent built-upon area) for areas closest to the water intakes (called the Critical Area) and either 3 dwelling units per acre (or 36 percent built-upon area) for developments without curb and gutter or 2 dwelling units per acre (or 24 percent built-upon area) for developments outside of the Critical Area with curb and gutter.

The County has gone beyond the requirements of the WS-IV classification in adopting watershed ordinances applicable to the entire Mountain Island Lake and Lake Norman watersheds within the County. These ordinances include provisions for stream buffers, development density, stormwater best management practices, and land use restrictions. The County has also protected major areas of Mountain Island Lake through acquisition of lands for use as natural areas and parks (Mecklenburg County, 1998A).

Lake Norman. Lake Norman, located within Subbasin 03-08-32 of the Catawba River Basin, is the power source for the Cowans Ford Hydroelectric Station and provides cooling water for the condensers at the Marshall Steam Station and the McGuire Nuclear Station (Mecklenburg County, 1992).

As shown on Figure 1, the northwest shoreline of Lake Norman is located in Catawba County, the southwestern shoreline is located in Lincoln County, the northeast is in Iredell County, and the southeast is located in Mecklenburg County. As shown on the Land Cover table in Appendix A (Table A-2) and Figure 4, the most prevalent land cover type around Lake Norman in the project area was forests as of 1996. At that time, there was a total of 2,233 acres of high and low intensity urban development, 36,724 acres of forest, 12,614 acres of open land, and 1,026 acres of agricultural land uses in the 0.5-mile-wide project area around the lake. The project area around Lake Norman totals 83,683 acres, of which 37 percent (31,086 acres) is the surface of the lake itself.

As shown on the Population Growth and Density table in Appendix A (Table A-3), Subbasin 03-08-32, which contains the Lake Norman portion of the project source basin area and includes portions of Catawba, Alexander, and Caldwell Counties, including the Town of Hickory, has experienced a slightly declining annual rate of population growth between 1970 and 1990 (averaging around 2 percent), with a steadily increasing amount of population density. Total population and density for this subbasin in 1990 was second highest among the other subbasins with 151,979 people, and 234 persons per square mile (DWQ, 1995).

Although somewhat rural since the lake's construction, the area around Lake Norman has recently experienced an increased rate of residential and non-residential development primarily as a result of freeway improvements (I-77 interchange) and redirection of growth from policies adopted with the 2005 Generalized Land Plan for Mecklenburg County (which calls for the entire county to be fully developed sometime in the next century). Such policies have contributed to several zone changes in recent years, bringing a major business park on 680 acres and major residential subdivision projects (one of 640 acres) to Mecklenburg's North District, west of I-77.

The Mecklenburg County North District Plan (which covers the historic communities of Cornelius, Huntersville, and Davidson) calls for a 61 percent population increase between 1990 and 2005 for the District (from 18,871 to 30,407 persons), and a 72 percent increase in the number of jobs provided in the District (from 7,443 to 10,307 jobs).

The main policies adopted by the County to guide growth in the North Mecklenburg District are as follows:

- Preserve and enhance the small town character
- Provide diverse opportunities for new, quality development
- Maintain sensitivity toward rural and historic features
- Protect the water quality of Lake Norman and Mountain Island Lake

Mountain Island Lake. Mountain Island Lake, the middle lake in the source basin project area, is located within Subbasin 03-08-33 of the Catawba River Basin (DWQ, 1995). The shoreline of the upper portions of the lake is mostly undeveloped and abundant with wildlife. In 1998, the Clean Water Management Trust Fund authorized the purchase of 8 miles of shoreline along the western side of the lake (encompassing a total of 1,100 acres in Gaston County and 200 acres in Lincoln County in NC) by the Trust for Public Land (TPL). This area extends from Riverbend Steam Station to south of Highway 73 and will eventually be transferred to the counties with the provision that it becomes a public park. On the Mecklenburg County side of the lake (the eastern shore), Cowans Ford Wildlife Refuge and Latta Plantation Park provide nature-oriented recreation and protect more than 2,500 acres of land in a natural setting. With the recent TPL purchase, development is prohibited on more than 50 percent of the shoreline of Mountain Island Lake. Shoreline development on the southern end of the lake consists mostly of large size scattered residential lots. Recently, however, several planned residential communities have been constructed along the lake – from 1990 to 1996 about 4,200 homes have been built in two census tracts that border the lake (USGS, 1998).

As shown on Figure 1, the western edge of the Catawba River south of Lake Norman Dam to the beginning of Mountain Island Lake is located in Lincoln and Gaston Counties, while the eastern edge of the river in this same stretch is located in Mecklenburg County. The western shoreline of Mountain Island Lake is located in Gaston County, while the eastern edge of Mountain Island Lake is located in Mecklenburg County.

Figure 4

As shown on the Land Cover table in Appendix A (Table A-2) and Figure 4, the most prevalent land cover type around Mountain Island Lake in the project area was forest as of 1996. At that time, there was a total of 227 acres of high and low intensity urban development, 5,181 acres of forest, 566 acres of open land, and 54 acres of agricultural land uses in the 0.5-mile project area around the lake. The project area around Mountain Island Lake totals 8,128 acres, including 2,099 acres of water.

As shown on the Population Growth and Density for Subbasins table in Appendix A (Table A-3), Subbasin 03-08-33 (which contains the project source basin area and includes only small rural portions of Gaston, Lincoln, and Mecklenburg Counties), has, like Subbasin 32, experienced a slightly declining annual rate of population growth between 1970 and 1990 (averaging around 2 percent), with a steadily increasing population density. Total population and density for this subbasin in 1990 was lowest among the other subbasins with only 47,301 people, and 218 persons per square mile (DWQ, 1995).

The eastern shore of Mountain Island Lake is located in Mecklenburg County's "Northwest District" planning area (which extends west of I-77 and north of I-85). According to this plan, the District's historical industrial image, coupled with the construction of I-85 fragmenting local neighborhoods and the lack of water and sewer services, have impeded the suburban residential growth experienced in other areas of the county. Overall, growth has been slow in the District; however, the 2005 Generalized Land Plan recognized the need to redistribute projected growth to all areas of the county. This plan established policies to encourage employment and residential growth into the District. The County is therefore recommending the extension of water and sewer services as "incentives for growth." The planned land uses around Mountain Island Lake are very low density, in keeping with the goal of the plan to protect the water quality of the City's main drinking water source (Mecklenburg County, 1990B).

The Mecklenburg County Northwest District Plan calls for a 27 percent population increase between 1985 and 2005 for the District (from 34,615 to 44,000 persons), a 45 percent increase in households (from 13,079 to 19,000), and a 68 percent increase in the number of jobs provided in the District (from 24,989 to 42,000 jobs).

The main policies adopted by the County to guide growth in the Northwest Mecklenburg District are as follows:

- Preserve and protect existing neighborhoods
- Revitalize declining areas
- Establish a balanced land use pattern that allows a variety of developed and open space land uses to retain some of the rural character of the area
- Restrict new industrial development to infilling existing industrial areas

Lake Wylie. The most downstream lake in the source basin project area is Lake Wylie, located within Subbasin 03-08-34 of the Catawba River Basin. As shown on Figure 1, the western edge of the Catawba River south of the Mountain Island Lake Dam to the beginning of Lake Wylie is located in Gaston County, while the eastern edge of the river in this same stretch is located in Mecklenburg County. The western shoreline of Lake Wylie is located in

Gaston County in North Carolina and York County in South Carolina. The eastern edge of Lake Wylie is located in Mecklenburg County.

As shown on the Land Cover table in Appendix A (Table A-2) and Figure 4, the most prevalent land cover type around Lake Wylie in the North Carolina project area was forest as of 1989-90. At that time, there was a total of 1,518 acres of high and low intensity urban development, 12,871 acres of forest, 1,738 acres of open land, and 10 acres of agricultural land uses in the 0.5-mile project area around the North Carolina side of the lake. The project area around Lake Wylie in North Carolina totals 29,722 acres. For the portion of Lake Wylie within South Carolina, the most prevalent land cover type as of 1996 was also forests. A total of 353 acres of urban uses, 12,715 acres of forested land, 117 acres of scrub/barren land, and 399 acres of agricultural uses are within the South Carolina portion of the Lake Wylie project area. The project area around Lake Wylie within South Carolina totals 13,584 acres (not including water).

As shown on the Population Growth and Density for Subbasins table in Appendix A (Table A-3), Subbasin 03-08-34 (which contains the project source basin area and includes the majority of the City of Charlotte and all of western Mecklenburg County and extends into Union County), has experienced an increasing annual rate of population growth between 1970 and 1990, with an exceptionally high amount of population density (seven times greater than the other two subbasins). Total population and population density for this subbasin in 1990 were the highest among the other subbasins, with 435,725 people and 1,372 persons per square mile, respectively (DWQ, 1995).

The Southwest Mecklenburg District Plan covers the source basin project area within Mecklenburg County and extends south of I-85, west of the City of Charlotte, east to Lake Wylie, and south to the South Carolina border. According to this land use plan, the District has retained a predominantly rural character while experiencing rapid urban growth in recent years. Lake Wylie and the Catawba River are unique resources that attract residents. In addition, a number of large industrial and office concentrations exist in the area, which, along with the Charlotte/Douglas International Airport, have been catalysts for growth.

The Mecklenburg County Southwest District Plan calls for a 12 percent population increase between 1995 and 2005 for the District (from 42,041 to 47,048 persons), a 16 percent increase in households (from 16,495 to 19,169 homes), and a 26 percent increase in the number of jobs provided in the District (from 55,238 to 69,508 jobs).

The main policies adopted by the County to guide growth in the Southwest Mecklenburg District are as follows:

- Preserve, protect, and enhance existing neighborhoods
- Establish a balanced land use pattern offering a diverse mixture of commercial, employment, residential, and open space uses
- Provide for the continuing positive economic impacts of the airport while mitigating airport impacts on residential uses
- Encourage and support residential growth in rural and waterfront areas through the extension of water and sewer services while protecting the environment

- Protect residential areas from encroaching nonresidential uses
- Maintain balance between growth and infrastructure needs that will provide an efficient and acceptable level of services and facilities
- Maintain balance between growth and environmental issues, including establishing environmental planning policies to protect the water quality of Lake Wylie and the Catawba River

Public Lands (Parks / Recreation Areas and Greenways)

The three lakes and a portion of the Catawba River that make up the project source basin provide many benefits to the public, including recreational boating, fishing, hiking, camping, wildlife preservation, and aesthetic enjoyment.

According to the North District Plan for Mecklenburg County, no state or federal parks exist in the entire County—the closest state park is 20 miles from Charlotte. However, the North District is planning the development of a large (800- to 1000-acre) park in its planning area. As shown on the Land Cover table in Appendix A (Table A-2), there are a total of 10 Mecklenburg County parks, 1,440 acres of NC State Park Lands, and 0 acres of South Carolina public lands in the source basin project area.

There are no nature preserves in the North District of Mecklenburg County, but there are two existing lake-access parks and two more planned:

- Ramsey Creek Park - 46 acre (existing)
- Brown Cove - 25 acre (existing, recreation/water access/nature trail)
- Jetton Road Park - 106 acre (planned, water access)
- McDowell Basin Park (planned 400 to 500 acre recreational park)

The Northwest District Plan for Mecklenburg County lists the following parks and nature preserves as currently existing or planned for the District near Mountain Island Lake:

- Latta Plantation Park – 763 acre (existing nature preserve, on shore of Mountain Island Lake, expansion planned)
- Neck Road Waterfowl Refuge – 1,000 acre (existing, leased nature preserve on edge of river)
- Mountain Island Waterfowl Refuge – planned nature preserve
- Mountain Island Water Intake District Park – planned smaller recreational park
- Nevin Park (under construction, 340-acre recreational and botanical garden park)
- Sugar Creek Park (existing recreational park)

According to the Southwest District Plan for Mecklenburg County, the following parks, greenways, and nature preserves currently exist or are planned for the District near Lake Wylie or the Catawba River:

- McDowell's Nature Preserve – 894 acres (multiple use park/nature area/water access area on Lake Wylie)
- Berryhill Park – 100 acres (proposed community park on shore of Lake Wylie)

- Gateway Park – 100 to 150 acres (proposed water access, marina, and neighborhood park on the Catawba River)
- Buster Boyd Bridge – proposed large boat ramp on Lake Wylie
- Greenway – proposed system along portions of shore of Lake Wylie and Catawba River

The East District Plan for Mecklenburg County lists the following parks and greenways as currently existing or planned for the District

- McAlpine Creek Greenway Park
- Albemarle Road Park (proposed 150-acre recreational park)
- Eastway District Park (proposed 100-acre recreational park)

Prime Agricultural and Forestry Land

Prime farmland is one of several kinds of important farmland defined by the USDA. It is of major importance in meeting the nation's short- and long-range needs for food and fiber. These soils are best suited for producing high yields of food, feed, forage, fiber, and oilseed crops with minimal input of energy and economic resources and the least damage to other environmental resources. Soils that have a high water table and are frequently flooded have severe limitations to manage and use for agriculture even if those soils qualify as prime agricultural land. These limitations would exclude almost all of the soils in the floodplains of the waterbodies in the source basin study area from being considered of significant importance as prime agricultural land.

Most of Mecklenburg County was originally a forest composed of hardwoods and communities of shortleaf, loblolly, and Virginia pine and eastern red cedar (USDA, 1980). This forest community has been progressively cleared out for wood products, crop production, and residential and industrial development. Natural reseeding of abandoned tracts of land has resulted in a mixture of pine and second growth hardwoods (USDA, 1980). Common trees found today in these forest lands are loblolly pine, shortleaf pine, scarlet oak, southern red oak, Virginia pine, white oak, yellow-poplar, and sweetgum (USDA, 1980). Forest land occupies approximately 67,491 acres or about 51 percent of the study area in the source basin. The composition of the forest land in the source basin is shown in the Land Cover table in Appendix A (Table A-2), and the distribution of forest land is presented in Figure 4.

Archaeological and Historic Areas

NCEPA requires the conservation and protection of the state's natural resources and preservation of "the important historic and cultural elements of our common inheritance." Archaeological sites are important since they contain the only material remains of extinct Native American cultures dating back 12,000 years throughout North Carolina. Historic structures are significant since they preserve North Carolina history. Historic districts consist of whole blocks of downtown areas including many structures that are culturally and historically significant. The Archaeological and Historic Resources by County table presented in Appendix A (Table A-4) summarizes the archeological and historical resources known to occur in the North Carolina counties that compose the project's source and receiving basins.

The Catawba River Basin and the Yadkin Pee-Dee River Basin contain many archeological sites that have been surveyed and several sites where significant archeological resources have been found from many native groups that lived in the region up until 200 years ago. Due to the size of the project's source and receiving basins, and the fact that no construction will occur with the project, no archeological survey was prepared for the project.

The Upper Piedmont has enjoyed a rich history since being settled by Europeans in the early 1700s. Several important historic sites and architecturally significant buildings have been identified and protected in the area also.

3.1.2.2 Primary Consequences

The IBT will not have any direct impacts on urban/developed land, public lands, prime agricultural land, forest land, or archeological or historic resources in the source basin. The expansion of raw water transmission lines, water treatment plants, and the finished distribution system in Mecklenburg County that will implement the IBT may have a direct impact on these land uses; however, the projects associated with the transfer of water will be permitted separately under appropriate state and federal programs and their environmental impacts evaluated under separate NCEPA documents. Many of the infrastructure improvements that transfer finished drinking water to the Rocky River Subbasin are already in place.

3.1.2.3 Secondary and Cumulative Consequences

As discussed in Section 3.1.4, the interbasin transfer will not affect the provision of water or sewer services in the source basin around Lake Norman, Mountain Island Lake, or Lake Wylie. The IBT will not significantly alter the availability of water to the source basin to serve existing and projected land uses and long-term water demand in the source basin. The interbasin transfer will not, when considered with other water withdrawal projected from the reservoir system, cause significant cumulative elevation changes in any of the project lakes, nor will water quality in any of the water bodies change substantially. Minimum releases of water from the various reservoirs in the chain will not change, even under severe drought conditions.

The project will therefore not change the existing pattern or rate of growth, use of land or water, or change in land uses from what is currently expected in the source basin. No land uses, private properties, public areas, recreational sites, archeological sites, historic structures, or water dependent structures will be flooded or drained with the transfer. The project will not induce, impede, or alter growth from what is currently planned. The IBT will not have any secondary or cumulative impacts to land uses or land resources in the source basin.

3.1.3 Fish and Wildlife Resources

3.1.3.1 Existing Environment

Wildlife Habitat and Resources

The Natural Communities in the Source Basin table presented in Appendix A (Table A-5) lists the types of Natural Communities that are predicted to occur in each of the counties that are present in the source basin project area. Since this list is based on County-wide data,

not all of these communities are likely to be present in the 0.5-mile lake perimeter source basin project area. Field studies were not undertaken as part of this EA.

A listing of SNHAs that are found in the counties that make up the source basin is found on page A-10 in Appendix A. This listing is provided by the NHP (see NHP April 1999 letter in Appendix B).

Fishery Habitat and Aquatic Resources

Lake Norman, Mountain Island Lake, and Lake Wylie contain important fisheries, aquatic resources and recreational values. The reservoirs that compose the source basin are particularly known for their catfish, striped bass, white bass, sunfish, crappie, largemouth bass, and carp fisheries. These lakes also support high recreational use by boaters, water skiers, and swimmers (North Carolina Wildlife Resources Commission [WRC] Scoping Letter, April 1999, Appendix B).

According to WRC records, the Catawba River Basin contains 88 fishery species, not including hybrids. Two species, highfin carpsucker and Carolina darter, are listed as Special Concern by the State. One fourth of the species (22) are considered game species by the WRC. Other popular sport fish include several catfish and sucker species. Most fishing effort by anglers is targeted at a limited number of species including trout, largemouth and smallmouth bass, striped bass, white bass, walleye, crappie, and sunfish. Excellent largemouth bass fisheries are found in Lake Wylie. Lake Norman is managed to provide high catches of striped bass (WRC, April 1998)

Fisheries management activities within the Catawba River Basin by the WRC include monitoring the abundance of fish populations, establishing harvest and size limit regulations, stocking fish, and manipulating habitat. Largemouth bass and smallmouth bass in the basin are managed under the WRC's Black Bass Management Plan. Striped bass are maintained in Lakes Norman and Mountain Island through annual stockings of fingerling fish. Occasionally, threadfin shad are collected in the spring and stocked in the upper four lakes to boost forage fish densities (WRC, April 1998).

Rare and Protected Species or Habitats

The Catawba River Basin contains over 175 rare plant and animal species. Within the Catawba River Basin, there are a total of seven endangered, threatened, or special concern animal species. In addition, the Catawba River Basin has over thirty rare plant species, including one listed as federally threatened. Many of the rare plants in the Catawba River Basin grow in the wet soils of bogs and are indirectly affected by water quality and quantity (WRP, April 1998).

A list of threatened, endangered, and sensitive species potentially occurring in the source basin is provided in Appendix A (Table A-6). This table lists the species of plants and animals known, suspected, or potentially occurring in the source basin project area that are listed by the state or federal governments as being threatened, endangered, rare, or sensitive. Specific regulations exist at the state and federal levels to protect endangered and threatened species and their habitats from impacts due to public or private projects and land-disturbing activities. The primary law that protects sensitive wildlife species is the Federal Endangered Species Act of 1973. Some of these species may or may not be present

in the specific 0.5-mile project area around Lake Norman, Mountain Island Lake, and Lake Wylie, since no field survey was performed to substantiate NHP records.

Of all the species potentially existing in the source basin, the one known to be present in the source basin (and the one that is the most endangered) is Schweinitz's sunflower (*Helianthus schweinitzii*). Schweinitz's sunflower is a federally listed endangered plant species that is endemic to the upper Piedmont area of North Carolina. Thirty-five populations are known – nineteen are centered around Charlotte, and the others are around Rock Hill, South Carolina. This species occurs in relatively open habitats – early successional fields, forest ecotonal margins, or forest clearings. It thrives in full sun but also grows in the light shade of open stands of oak-pine-hickory. Schweinitz's sunflower generally occurs in moist to dry clay soils or soils that are clay-loams or sandy-clay loams with high gravel content. Formerly, the species probably occurred in prairie-like habitats or oak savanna maintained by fires set by lightning or Native Americans.

Loss of this open habitat to fire suppression and urbanization has resulted in the decline of the species and its reduction to marginal and vulnerable sites such as roadsides, power line easements, and old pastures (USFWS, 1994). (Also see USFWS Scoping Letter for the Three-County EA in Appendix B).

Schweinitz's sunflower has been identified at three locations within 1 mile of Lake Wylie in York County, South Carolina (see letter from South Carolina Department of Natural Resources dated May 7, 1999 in Appendix B). Other populations of the species are known to exist within NC SNHAs in Mecklenburg County–Winget Road Rare Plant Site; Mt. Island Lake Dam Rare Plant Site SNHA; Shuffletown Powerline Rare Plant Site SNHA; Gar Creek Rare Plant Site SNHA; and McCoy Road Sunflower Park SNHA.

3.1.3.2 Primary Consequences

In total, there are 20 SNHAs, 2 rare natural communities, 1 Wildlife Refuge, 6 sensitive invertebrate species (including 3 Special Concern mussel species), 5 rare vertebrate animal species, and 10 sensitive vascular plant species potentially existing in the source basin. In addition, there is a substantial number of recreational fishery species that exist in the lakes that compose the source basin.

Both aquatic and terrestrial resources that inhabit lake or stream-side habitat, including aquatic and wetland plants, freshwater mussels, and fisheries in the source basin, could be directly affected by water quality and quantity changes from transfers of water out of the basin, if lake elevations or the volume or rate of flow between reservoirs change dramatically. Such changes could lead to either flooding or draining of sensitive species or habitat areas, or shifts in water quality, depending on how the hydrology in the system changes.

As discussed in Section 3.1.4, an analysis conducted by Duke Power under normal and drought conditions has indicated that there will be no changes in the surface water elevations of Lake Norman, Mountain Island Lake, or Lake Wylie due to the proposed IBT. The FERC application for the additional withdrawal from Mountain Island Lake as part of this IBT concluded that changes in Catawba River flow and lake elevations due to the increase in average annual withdrawals would be insignificant (CMUD, 1999). No

significant changes to river flows, lake elevations, or system hydrology will occur in the three lakes.

Therefore, the IBT is not expected to significantly impact fish, wildlife, or aquatic species in the source basin. Only under more pronounced drought conditions will the surface water elevations upstream of the Mountain Island Dam decrease moderately; however, this moderate effect is not anticipated to be significant in terms of impacts on wildlife or aquatic resources in the source basin (see Water Quality/Water Resources, Section 3.1.4).

As discussed in the FERC application for the increased withdrawal from Mountain Island Lake associated with the IBT (subject to a separate EA), there has been some wildlife concerns in the past regarding fishery resources being subject to entrainment and impingement on intake screens. The concern is that resident fish eggs not attached to rock substrata or vegetation would float with the currents and be susceptible to entrainment. In addition, larval fish have only limited swimming abilities, and larval fish emerging along the reservoir shoreline in the proximity of the intake may be subject to entrainment also. The FERC application concludes that during normal operations, water will be withdrawn from the lake through a combination of four cells, up to the maximum requested rate of 330 mgd, at intake velocities below 0.5 feet per second (fps), which is the maximum velocity preferred by NC Wildlife Resources. The FERC application concludes that even under drought conditions, the approach velocities for all four cells will be below 0.5 fps (CMUD, 1999).

The proposed IBT does not require the construction of additional water intake structures in Mountain Island Lake. Any proposed pumping stations and conveyance lines associated with implementing the transfer will be permitted separately under appropriate state and federal programs and their fish, wildlife, and sensitive species impacts evaluated under a separate NCEPA or NEPA process.

With no significant changes to lake elevation, lake and basin hydrology, or water quality in the source basin, the interbasin transfer project will not have any significant direct impact on fish, aquatic, wildlife, or sensitive resources within the source basin.

3.1.3.3 Secondary and Cumulative Consequences

As discussed in Section 3.1.4, the interbasin transfer will not affect the provision of water or sewer services or other infrastructure in the source basin around Lake Norman, Mountain Island Lake, or Lake Wylie. The project will not change the existing pattern or rate of growth expected in the source basin. The interbasin transfer will not, when considered with other water withdrawal projected from the reservoir system, cause significant cumulative lake elevation changes or water quality impacts. The project will therefore not have any secondary or cumulative impacts to fish, aquatic or terrestrial wildlife resources, or sensitive species in the source basin.

3.1.4 Water Resources / Water Quality

3.1.4.1 Existing Environment

The study area of the source basin includes the water resources of Lake Norman, Mountain Island Lake, Lake Wylie, and the sections of the Catawba River connecting these reservoirs. In addition, numerous tributaries to the Catawba River in Mecklenburg County also form

part of the water resources in the source basin. These surface waters are contained in subbasins 030832, 030833, and 030834 (Figure 5). The Characteristics of Lake Norman, Mountain Island Lake, and Lake Wylie table provided in Appendix A (Table A-7) summarizes major features of the three lakes, which are all owned by Duke Power and used for power generation, water supply, and recreation.

Figure 5 delineates the Water Supply Watershed Areas in the study area. In North Carolina, all waterbodies used for public water supply are given a "WS" classification. The largest waterbodies in the study area of the source basin have been classified "WS" waters. Minimum statewide water supply protection standards (certain watershed development and wastewater discharge restrictions) apply to the Water Supply Watershed Areas.

Lake Norman

The waters of Lake Norman are classified WS-IV CA from Lookout Shoals Dam to Lyle Creek and WS-IV, B CA from Lyle Creek to Cowans Ford Dam (Figure 5). WS-IV waters have moderately to highly developed watersheds and the water requires a high degree of treatment. Municipal and industrial point sources are allowed in WS-IV waters.

The DWQ ambient monitoring stations for the surface waters are also shown in Figure 5. According to the DWQ (DENR, 1998), Lake Norman is oligotrophic and fish tissue samples analyzed from the lake have not exceeded U.S. Food and Drug Administration (FDA) or EPA criteria. In addition, other water quality parameters sampled in the lake indicate that the lake water quality is good.

CMUD is permitted by FERC to withdraw water from Lake Norman at a maximum instantaneous rate of 108 mgd, for treatment at the North Mecklenburg Water Treatment Plant which has a current treatment capacity of 18 mgd.

Mountain Island Lake

Mountain Island Lake is classified as WS-IV from Cowans Ford Dam to the water intake at the River Bend Steam Station and as WS-IV and Class B water from the water intake to the Mountain Island Dam. The major tributaries to Mountain Island Lake are Gar Creek and McDowell Creek.

Mountain Island Lake has been classified as oligotrophic and fish tissue samples analyzed from the lake have not exceeded the EPA criteria for metals or pesticides (DENR, 1998). Elevated nutrient concentrations have been found in the McDowell Creek arm of the lake due to discharge from the McDowell Creek WWTP. However, problematic algal bloom conditions have not been documented (DENR, 1998). According to DENR (1998), there are no significant water quality problems in the lake.

Figure 5

Water from Mountain Island Lake is withdrawn by CMUD through their Catawba River Raw Water Pump Station and sent to the Hoskins reservoirs, which supply water to two water treatment plants – Franklin WTP and Vest WTP. CMUD is currently applying to FERC to increase the maximum instantaneous withdrawal rate from the Catawba River Raw Water Pump Station from 165 mgd to 330 mgd. The increased withdrawal rate will provide CMUD with reliability and operational flexibility, and increase capacity to meet demands through 2030.

Lake Wylie

Lake Wylie (in subbasin 030834) is formed by the drainage of the Catawba River, the South Fork of the Catawba River, and various tributaries. Lake Wylie is classified as WS-IV CA from Mountain Island Dam to I-85, WS-IV B CA from I-85 to the upstream side of the Paw Creek arm, and WS-V B from the Paw Creek arm to the State Line (Figure 5). WS-V waters are intended for future water supplies and have water quality standards similar to other WS waters. A WS-V classification, however, is not intended for waters currently used as a water supply. WS-V waters have no categorical restrictions on watershed development or wastewater discharges. The South Carolina portion of Lake Wylie has been classified as FW (similar to a WS-V classification in North Carolina).

The DWQ has classified Lake Wylie as eutrophic. A similar classification was made by the South Carolina Department of Health and Environmental Control (SC DHEC, 1996). Algal blooms and fish kills have been observed in embayments and tributary arms of the lake (DWQ, 1995). DWQ has reported that total phosphorus, total organic nitrogen, and chlorophyll *a* concentrations are the highest in the Crowders Creek arm of the lake (DENR, 1998). Nutrient loading into the lake has been linked to both point and non-point sources (DWQ, 1995). Fish tissue samples analyzed from the lake have not exceeded FDA and EPA criteria for metals or pesticides (DENR, 1998).

According to SC DHEC, Lake Wylie supports its recreational uses. However, aquatic life uses are impaired above the Mill Creek arm, and are threatened in the Crowders Creek embayment due to metals and low dissolved oxygen originating in North Carolina (SC DHEC, 1996). SC DHEC has reported high concentrations of chromium, zinc, copper, and nickel in lake sediments. In addition, the same agency also detected PCB-1254 and several pesticides in sediment samples.

303 (d) Listed Streams

Section 303(d) of the Clean Water Act requires that states develop a list of waters not meeting water quality standards or which have impaired uses. The State must prioritize these waterbodies and prepare a management strategy or total maximum daily load (TMDL). Lake Norman, Mountain Island Lake, and Lake Wylie are not included in North Carolina's 303 (d) list for the Catawba River Basin. However, McDowell Creek, a tributary of Mountain Island Lake, has been listed as impaired mainly due to urban run-off and land development. DWQ has assigned a low priority to these streams. In South Carolina, the Mill Creek arm of Lake Wylie has been included as medium priority by SC DHEC due to copper.

Currently, based on a joint effort by the governments of North Carolina and South Carolina, no new discharges to the lake system are allowed unless it is found to be the most environmentally sound alternative; existing dischargers should be removed as alternatives

become available; and expansions should not increase the existing nutrient load from existing facilities (SC DHEC, 1996).

3.1.4.2 Primary Consequences

Duke Energy has stated that, as CMUD's withdrawals and interbasin transfers increase, they expect to operate the reservoirs of the Catawba-Wateree Project within the same elevation ranges that they have been historically operated within. This limits the potential impacts of the proposed increase in interbasin transfer to the cumulative reservoir outflows and power generation.

An analysis conducted by Duke Energy under normal and dry conditions has indicated that there will be no changes in the surface water elevations of Lake Norman, Mountain Island Lake, or Lake Wylie due to the proposed increased interbasin transfer. Under normal inflow conditions the additional withdrawal would reduce power generation by about one percent, and the cumulative outflows from Mountain Island Lake and Lake Wylie would be decreased three to four percent. A similar analysis using the lowest average annual inflow observed from 1955 to 1996 indicated that the cumulative outflow from Mountain Island Lake would be reduced by about 10 percent. Minimum release requirements and operating lake surface elevations for all the reservoirs were maintained under all conditions analyzed.

Under more extreme drought conditions, Duke Power would reduce power generation and manage all lakes in order to meet minimum release requirements established in the existing FERC license (personal communication with Mr. Steve Gaffney of Duke Energy). Assuming an average weekly inflow of 496 cfs to Mountain Island Lake, which has historically been exceeded 90 percent of the time (representing the 7Q10 flow), the lakes upstream of the Mountain Island Dam would need to be drawn down by about 0.3 inch per week to maintain the minimum release at the Dam.

During a drought situation CMUD would be following its Water Shortage Response Plan, which includes either voluntary or mandatory conservation measures depending on the severity of the drought. The results of the evaluations previously discussed do not consider conservation measures customarily implemented in a drought period which tend to reduce water use rates below the average. Therefore, the expected impacts on lake surface elevations and cumulative reservoir outflows during a drought would be less severe than those previously presented.

There are no expected significant direct impacts in water quality in the source basin as the result of the transfer of water from Mountain Island Lake. Direct impacts in the water quality of surface waters in the source basin are not expected because there will not be any major changes in the hydrology of the system due to the increased withdrawal. Since the hydrology of the system will not be affected in any major manner due to the proposed transfer, water quality is not expected to be affected in Lake Norman, Mountain Island Lake, Lake Wylie, nor in the other surface waters of the study area in the source basin. Therefore, the assimilative capacity of the surface waters in the source basin is not expected to change due to the proposed transfer of water. In addition, DWQ discourages lake dischargers.

3.1.4.3 Secondary and Cumulative Consequences

The proposed transfer does not require the construction of additional water intake structures in Mountain Island Lake. Indirect impacts associated with expanding pumping facilities, existing wastewater treatment plants, raw water transmission lines, water treatment plants, and the finished distribution system will be permitted separately under appropriate state and federal programs. Their environmental impacts will therefore be evaluated under a parallel NCEPA process.

The proposed interbasin transfer will allow CMUD to meet increased average annual demands through 2030 in response to increased population in its service area, which includes all of Mecklenburg County. The 2005 Generalized Land Plan for Mecklenburg County indicates that the area around Charlotte in the source basin will continue to be urbanized as metropolitan bedroom communities with or without the proposed transfer of water. The interbasin transfer will not affect the provision of water or sewer services in the source basin around Lake Norman, Mountain Island Lake, or Lake Wylie. The project will therefore not change the existing pattern or rate of growth expected in the source basin.

The proposed transfer amount of 33 mgd represents 20 percent of CMUD's future average annual water use. In addition, based on estimated withdrawals provided by Duke Power and water supply plans, the proposed transfer is only 5 percent of the potential future average annual withdrawal by all non-power users from Duke Power's Catawba-Wateree Project. Therefore, the potential cumulative impact of the proposed water transfer on the Catawba-Wateree lake system is considered minor. The proposed transfer will not result in significant adverse impacts related with water availability for other existing and future users of water in the source basin.

There are no secondary impacts on water quality or water supply related to growth due to the transfer of water from the source basin. There are no significant cumulative impacts in the source basin directly related to the transfer of water.

3.1.5 Air Quality

3.1.5.1 Existing Environment

According to the *1998 State of the Environment Report: Mecklenburg County, NC* (MCDEP, 1998A), the overall ambient air quality has steadily improved since 1980. An Air Quality Index (AQI) is used to report ambient air conditions, and the AQI ranges from good, moderate, unhealthy, very unhealthy, to hazardous. Through 1998 Mecklenburg County index levels had not exceeded the unhealthy range, with most reports indicating the air quality is good or moderate. The county had been a non-attainment area for ozone and carbon monoxide but was redesignated in 1995 as an attainment area.

A new, more stringent National Ambient Air Quality Standard (NAAQS) for ozone was established by EPA in 1997, and the greater Charlotte-Mecklenburg region has been struggling to meet this new standard. The new 0.08 ppm eight-hour average standard took effect in 1997; however, on May 14, 1999, a federal appeals court blocked the EPA from imposing the new standard. The three monitoring sites in Mecklenburg County have been in violation of the new standard for the first two years of data collection (1997 and 1998). If the old standard 0.12 ppm one-hour average is considered, two Mecklenburg County sites

are currently in violation of this standard. Regardless of the court battle, Mecklenburg County and the surrounding areas will likely be classified as a non-attainment area for ozone. Once the attainment level is determined, the non-attainment contingency plan will be reviewed and implemented over an anticipated two to five year time frame.

Ozone is not directly emitted, but is formed when sunlight reacts with volatile organic compounds (VOCs) and nitrogen oxides (NO_x). According to the NC Air Awareness program, NO_x is the limiting factor on the formation of ozone in North Carolina because of the abundance of naturally occurring VOCs from trees, which cannot be controlled. In NC urban areas, more than 60 percent of NO_x emissions are from automobiles.

3.1.5.2 Primary Consequences

There is no construction associated with the IBT, and the increased withdrawal of water will not affect air quality. Therefore, there are no primary air quality impacts in the source basin.

3.1.5.3 Secondary and Cumulative Consequences

Any change in lake elevations due to the IBT will not affect air quality. The IBT will also not affect the provision of water, sewer, or other infrastructure elements in the project source basin; therefore, there are no secondary or cumulative air quality impacts in the source basin.

3.1.6 Groundwater Resources

3.1.6.1 Existing Environment

Mecklenburg County is located in the physiographic region described as the Piedmont region, which is between the Blue Ridge and the Coastal Plain regions. According to the North Carolina Cooperative Extension Service, the crystalline bedrock aquifer in the Piedmont region has relatively little storage capacity, and the well yields tend to be low (around 5 to 35 gal/min). The USGS indicates that the major groundwater related issues in North Carolina are (1) declining water levels (especially in the Coastal Plain region); (2) contamination from hazardous wastes and landfill leachate; and (3) effects of land use on water quality (especially the effects of urbanization). While groundwater is used by individuals and some community systems in Mecklenburg County, it is not an appropriate source for centralized use by CMUD because of insufficient yield and the costs associated with combining surface and groundwater resources.

According to the *1998 State of the Environment Report for Mecklenburg County* (MCDEP, 1998A) most of the wells used for water supply are located in rural areas; however, there are private and community wells located within CMUD's water supply service area. Based on the ambient groundwater sampling network for Mecklenburg County, the 1997 average values are within the suggested EPA drinking water levels except manganese and iron. Manganese is not known to have a toxicological effect, and the recommended limit is based largely on aesthetic and taste considerations. The recommended limit on iron is also based on aesthetic and taste considerations and not physiological effects.

In 1997 there were more than 700 known or potential sources of groundwater contamination in Mecklenburg County (the Mecklenburg Priority List [MPL]). As of December 1997, the Mecklenburg County Department of Environmental Protection (MCDEP) had evaluated 225

sites with 146 of the sites identified in areas where groundwater is accessed as a potable source. The western portion of the county has the highest number of MPL sites, while the southern and eastern portions have the least. The highest concentration of sites is located in Uptown Charlotte; however, groundwater is not used as a drinking water source. The 28214 zip code, directly west of Uptown to the Catawba River, has the highest number of MPL sites per given zip code and is the area of greatest concern because many residents use groundwater as a drinking water source.

3.1.6.2 Primary Consequences

There is no construction associated with the IBT, and the increased withdrawal of water will not affect groundwater resources. According to *Basic Elements of Ground-Water Hydrology with References to Conditions in North Carolina* (Heath, 1980), groundwater recharge occurs by precipitation in all inter-stream areas (areas except along streams and their adjoining flood plains) (Heath, 1980). Streams and flood plains are, under most conditions, discharge areas for groundwater; therefore, there are no primary impacts to groundwater resources due to the project.

3.1.6.3 Secondary and Cumulative Consequences

As described in the Primary Consequences section above, any change in lake elevations (which would only occur during extreme droughts) due to the IBT will not affect groundwater resources; therefore, there will be no significant secondary or cumulative impacts expected on groundwater resources as a result of the project.

3.1.7 Noise Level

3.1.7.1 Existing Environment

Quiet is conducive to psychological and physiological well-being for humans. Just as excessive noise has been documented to negatively affect human health and welfare, elevated noise levels from human activities can disrupt the normal behavior patterns of wildlife, interfering with migration, breeding, hunting, and predator avoidance.

The source basin currently exhibits the day-to-day normal noise conditions representative of mainly forested and open land cover areas surrounding the three lakes. Seasonal use of the lakes for recreational purposes contributes to increased mobile sources, as well as watercraft, noise during the warmer months. Lake-front living continues to be popular; therefore, construction of new subdivisions, homes, and commercial development surrounding the lakes results in increased noise.

3.1.7.2 Primary Consequences

There is no construction associated with the IBT, and, therefore, no increase in noise levels from the IBT. The increased withdrawal of water will not affect noise levels in the source basin; therefore, there are no primary noise impacts in the source basin.

3.1.7.3 Secondary and Cumulative Consequences

The IBT will not facilitate growth or recreational use in the source basin, therefore, no secondary or cumulative noise impacts will result from the proposed project.

3.1.8 Toxic Substances/Hazardous Wastes

3.1.8.1 Existing Environment

There are no operating hazardous waste disposal sites in Mecklenburg County; however, the *1998 State of the Environment Report: Mecklenburg County, NC* (MCDEP, 1998A) reports that there were 14 treatment, storage, or disposal facilities (TSDs) and 12 transporters of hazardous waste in 1997. Approximately 19.0 million pounds of hazardous waste was generated in 1997 by 59 large generators and 313 small generators. There were 442 conditionally exempt generators that reported to the State of North Carolina in 1997 (MCDEP, 1998A).

Potential sources for toxic substances present in the source basin study area are agricultural-related substances such as fertilizers, weed control chemicals, and pesticides. Other common toxic substances are employed in the construction of homes and commercial buildings such as glues, solvents, and paints. Typical household hazardous wastes would include oils, cleaners, solvents, paints, herbicides, and fertilizers.

3.1.8.2 Primary Consequences

There is no construction associated with the IBT. Although it is difficult to track the ultimate disposal of non-regulated waste disposal, it is expected that most materials are properly disposed of at collection sites throughout the county. Expansions to the North Mecklenburg, Vest and Franklin water treatment plants will occur because of the increased water withdrawals associated with the IBT. Although these expansions may involve increases in the amount or types of toxic or hazardous substances used to treat the water for public consumption, the potential environmental and health impacts of the use and disposal of such chemicals is beyond the scope of this EA. Such impacts are more appropriately addressed within the EA or EIS document that will be required under NCEPA before each water treatment plant is permitted to expand. The Division of Water Resources and Division of Water Quality will only permit expansions to water treatment plants if it will not involve releases of toxic substances or hazardous waste. There are, therefore, no potentially significant impacts to the environment from releases of toxic substances or hazardous wastes associated with the proposed IBT.

3.1.8.3 Secondary and Cumulative Consequences

Any change in lake elevations due to the IBT will not affect the potential release of toxic substances or hazardous wastes; therefore, there are no secondary or cumulative impacts expected.

3.2 Receiving Basin

The "receiving basin" is considered to be the portion of the study area that is within the Rocky River Subbasin. The receiving basin study area includes the Mecklenburg County portion of the receiving basin east of the ridge line with the exception of the Goose Creek watershed. It also includes Mallard Creek from the WWTP discharge point along the Rocky River to the intersection with NC 205.

The boundary of the study area around water bodies is offset 0.5 mile from the shoreline to incorporate flood plain areas as shown on FEMA flood zone maps (See Figure 1).

This section describes the existing environment for each area studied, followed by a discussion of the primary consequences of the proposed IBT, if any, for the area. Secondary and cumulative impacts in the receiving basin are discussed in Section 4.

3.2.1 Wetlands

3.2.1.1 Existing Environment

The receiving basin consists of:

- The eastern 30 percent of Mecklenburg County that is located within the Rocky River Subbasin of the Yadkin Pee-Dee River Basin with the exception of the Goose Creek watershed,
- Mallard Creek from the Mallard Creek WWTP downstream to the Rocky River, and
- The Rocky River continuing to its intersection with NC 205.

This western Piedmont physiographic province of the state is characterized by gently sloping to strongly sloping, well drained and moderately well drained soils that have a clayey or loamy subsoil (USDA, 1980).

Within the 114,046-acre receiving basin study area, 2,710 total acres of various types of wetlands have been identified by the NWI (as published by the USFWS). Of those total acres of wetlands, 1,723 acres are within the Mecklenburg County portion of the receiving basin, while 987 acres are located along Mallard Creek and the Rocky River within Cabarrus, Union, and Stanly Counties. These figures are presented in the Land Cover table presented in Appendix A. A wetlands field delineation was not performed for the receiving basin due to the large study area.

The majority of the wetlands within the receiving basin project area identified on the NWI maps are bottomland hardwood forests of the Palustrine Piedmont/ Low Alluvial Forest type. Other types of wetlands that are known to occur in the receiving basin are listed in the Wetland Types Predicted in the Receiving Basin Table in Appendix A (Table A-8).

The following SNHAs containing wetland natural communities have been listed by NHP and were identified as being within the USGS quadrangles that compose the receiving basin project area:

- Back Creek Swamp, Cabarrus and Mecklenburg Counties, Harrisburg Quad, Swamp Forest
- Rocky River/Harrisburg Bottomland, Cabarrus and Mecklenburg Counties, Piedmont/Low Mountain Alluvial Forest

In addition to those communities listed by NHP for the receiving basin, WRP lists the Piedmont/Mountain Swamp Forest, Hillside Seepage Bog, and Upland Pool wetland community types as existing in the Yadkin-Pee Dee River Basin (WRP, 1998B).

3.2.1.2 Primary Consequences

There is no construction proposed, and therefore no direct impacts to wetlands possible, as a result of the IBT. In addition, existing wastewater treatment plants in the receiving basin (CMUD's Mallard Creek in Mecklenburg County and the Rocky River Regional WWTP in Cabarrus County) will not require expanded or amended National Pollutant Discharge Elimination System (NPDES) permits to process the increased wastewater expected in the basin as a result of the IBT. Current NPDES permits for these facilities have complied with NCEPA requirements. The IBT will therefore not significantly impact water quality or quantity (including temperature, nutrients, toxics, stream flow, erosion or flood levels) in Mallard Creek or the Rocky River. Overall, the potential direct impacts of the IBT on wetlands in the receiving basin are considered insignificant.

3.2.2 Land Use

3.2.2.1 Existing Environment

Urban/Developed Lands

Future planned land uses for the receiving basin are provided on the Proposed Land Use Maps in Appendix C. These maps were taken from each of the District Plans for Mecklenburg County. Since these land use maps are not available in GIS format, a GIS analysis of projected land uses in the receiving basin was not possible. The analysis of land uses as follows was therefore achieved through the use of land cover GIS data layers from the North Carolina Center for Geographical Information and Analysis (CGIA), which show only existing land uses for the project area in 1996.

Mecklenburg County The study area of the receiving basin contains small portions of the Towns of Davidson, Cornelius, Huntersville, Mint Hill, Matthews, and Stallings. The majority of the Mecklenburg portion of the receiving basin, however, is located in unincorporated Mecklenburg County.

As shown on the Land Cover table in Appendix A (Table A-2) and Figure 4, the most prevalent land cover type in the Mecklenburg County portion of the receiving basin was forest as of 1996. At that time, there was a total of 7,662 acres of high and low intensity urban development, 57,948 acres of forest, 1,883 acres of agricultural cropland and pasture, and 21,705 acres of vacant shrubland in this area. No federal lands were identified in the area. The entire Mecklenburg County portion of the receiving basin totals 89,530 acres, including 332 acres of water.

The majority of the Mecklenburg County portion of the receiving basin is contained in Subbasin 03-07-11, which also includes portions of Cabarrus, Iredell, and Rowan Counties, and portions of the Towns of Harrisburg, Concord, Kannapolis, and Hickory, which are outside of the project area. As shown on the Population Growth and Density for Subbasins 11 & 12 table in Appendix A (Table A-9), even though Subbasin 11 experienced a decline in population and density between 1970 and 1980, it experienced an increased annual rate of population growth between 1980 and 1990 (of 1.9 percent). Total population for Subbasin 11 in 1990 was 78,047, with a density of 282 persons per square mile (DWQ, 1997).

A small portion of the southern end of the Mecklenburg portion of the receiving basin is contained within Subbasin 03-07-12. This subbasin also includes the Towns of Indian Trail, Locust, Stanfield, Mt. Pleasant, Concord, and Kannapolis, which are also outside of the project area. As shown on the Population Growth and Density for Subbasins 11 & 12 table in Appendix A (Table A-9), even though Subbasin 12 experienced a slightly declined population and density growth rate between 1970 and 1980, it experienced an increased annual rate of population growth between 1980 and 1990 of 1.5 percent. Total population and density for Subbasin 12 in 1990 was substantially higher than Subbasin 11 (with 125,021 persons and a density of 288 persons per square mile) (DWQ, 1997).

Many activities are occurring in eastern Mecklenburg County that will continue to encourage growth and development in the IBT receiving basin area:

- Construction of the Outer Loop (I-485) and interchanges to local roads (anticipated to be completed by 2015)
- Expansion of the Huntersville Business Park
- Expansion of UNC Charlotte
- Addition of a large K-12 educational campus near IBM
- New employers along I-77 and expanded research district areas
- Continued retail and multi-family development along US 74
- Continued suburban residential growth throughout the region

Overall, the policies adopted for the three planning Districts in the Mecklenburg County IBT receiving basin are to accommodate and encourage growth and full urbanization of the region through the next century (Mecklenburg County, 1990A, 1990B, 1991, 1992, 1996). The Northeast District Plan predicts development in eastern Mecklenburg County will join development in Cabarrus County, creating a “continuous urban suburban mass extending from Uptown Charlotte to the center of Concord.” The only non-developed areas of the District appear to be within the “park/greenway” land use category.

All three plans recognize that package treatment plants and individual well and septic tanks in the eastern drainage basins of their County are negatively affecting the environment. These plans also recognize that lack of public water and sewer are inhibiting full build-out of the region. Thus, all of the plans have included clear goals to provide water and sewer services to the eastern portion of the County, including the construction of additional wastewater treatment facilities in the Rocky River Drainage Basin. The eventual provision of water and sewer to this area is clearly assumed in future land use and population projections for the districts. The proposed IBT and the resulting water and sewer services it will initiate are therefore consistent with the County’s land use and growth plans for the receiving basin.

Mallard Creek and Rocky River Corridor The second portion of the receiving basin project area for the IBT is located along Mallard Creek at the Mallard Creek Water Reclamation Facility discharge, down to the confluence with the Lower Rocky River, and then down the main stem of the Rocky River to its intersection with SR 205 in Union County. The project area

includes the main stem of the water body, and extends 0.5 mile out from the streambank (see Figure 1). This portion of the receiving basin encompasses portions of the Towns of Mallard Creek and Harrisburg, and the Counties of Mecklenburg, Cabarrus, Stanly, and Union.

As shown on the Land Cover table presented in Appendix A (Table A-2) and Figure 4, the most prevalent land cover type in the Stream Corridor portion of the receiving basin was forest as of 1996. At that time, there were a total of 191 acres of high and low intensity urban development, 15,202 acres of forest, 3,134 acres of agricultural cropland and pasture, and 5,892 acres of vacant shrubland in this area. No federal lands were identified in the area. This portion of the receiving basin totals 24,420 acres, including 97 acres in lake waters.

Public Lands (Parks / Recreation Areas and Greenways)

According to the North District Plan for Mecklenburg County, no state or federal parks exist in the entire County - the closest state park is 20 miles from Charlotte. However, the North District is planning the development of a large (800 to 1,000 acre) park in its planning area. In addition, a Greenway Master Plan was adopted for the County in 1980 that calls for greenways along major creeks, rivers, and lakes; however, little land had been purchased and few greenways developed as of 1992 (Mecklenburg County, 1992). Noteworthy creeks planned for County Greenways include:

- Reedy Creek
- McAlpine Creek

As shown on the Land Cover table in Appendix A (Table A-2), there are a total of 11 parks and 435 acres of greenways in the Mecklenburg County portion of the receiving basin. This table also shows that the receiving basin river corridor contains no state and county parks or greenways.

There are no nature preserves in the North District of Mecklenburg County, but there are two parks existing or planned in the area (in addition to many neighborhood parks owned and managed by the local towns):

- Holbrooks Road Park (existing 75 acres, planned for expansion by 25 acres)
- Rocky River Park (proposed 100+ acre park)

The Northeast District Plan for Mecklenburg County lists the following parks and nature preserves as currently existing or planned for the District in the receiving basin:

- Reedy Creek Nature Preserve and Park (700-acre existing nature preserve, trail and park; proposed for 300-acre expansion)
- Mallard Creek Park (under construction, 500-acre recreational park)
- Mallard Creek Greenway (two-mile existing greenway and trails, more greenway planned)
- Back Creek Park (proposed recreational park, 20 to 400 acres)
- University District Park (proposed recreational park)
- Newell Park (proposed greenway park)

According to the East District Plan for Mecklenburg County, the following parks, greenways, and nature preserves currently exist or are planned for the District:

- Harrisburg Road Park (existing recreational park, planned expansion by 200 acres)
- Mint Hill Park (proposed 100-acre recreational park)

Prime Agricultural and Forestry Land

According to the Soil and Water Conservation District for Mecklenburg, 11 percent of the total soils in Mecklenburg County are considered suitable for prime farmland. This translates into a small proportion (approximately 3 percent) of the total soils in the Mecklenburg County portion of the receiving basin considered suitable prime land if it is assumed that there is an even distribution of the soils throughout the county.

The original forest communities of Mecklenburg, Cabarrus, Union, and Stanly Counties are being progressively cleared out for wood products, crop production, and residential and industrial development. The Forest Natural Communities in the Receiving Basin Table in Appendix A (Table A-10) lists the known types of terrestrial or upland forest Natural Communities that occur in the receiving basin counties. Wetland forests known to exist in the receiving basin are listed in the Wetlands Section.

Common trees found today in these forest lands are beech, red maple, tuliptree, scarlet oak, chestnut oak, white oak, loblolly pine, shortleaf pine, southern red oak, Spanish oak, post oak, mockernut hickory, pignut hickory, Carolina shagbark hickory, red hickory, Virginia pine, yellow-poplar, and sweetgum (Schafale and Weakley, 1990; USDA, 1980).

Undeveloped forest land currently occupies a total of approximately 73,000 acres or about 64 percent of the receiving basin study area. The distribution of forest land is presented in Figure 4.

Archeological and Historic Areas

Table A-4 in Appendix A summarizes the archeological and historical resources known to occur in the North Carolina counties that compose the project's receiving basins.

The Catawba River Basin and the Yadkin Pee-Dee River Basin contain many archeological sites that have been surveyed and several sites where significant archeological resources have been found from many native groups that lived in the region up until 200 years ago. Due to the size of the project's source and receiving basins, and the fact that no construction will occur with the project, no archeological survey was prepared for the project.

The Upper Piedmont has enjoyed a rich history since being settled by Europeans in the early 1700s. Several important historic sites and architecturally significant buildings have been identified and protected in the area also.

The three District Plans in place for the Mecklenburg County portion of the receiving basin have included Historic Resource Protection elements that call for the identification and preservation of historic properties and districts within the County.

3.2.2.2 Primary Consequences

The IBT will not have any direct impacts on urban/developed land, public lands, prime agricultural land, forest land, or archeological or historic resources in the receiving basin since no construction related to the IBT is planned.

3.2.3 Fish and Wildlife Resources

3.2.3.1 Existing Environment

Wildlife Habitat and Resources

The natural communities predicted to occur in the counties that compose the receiving basin project area, according to the NHP, are listed in Appendix A (Table A-12). Not all of these communities are likely to be present in the receiving basin project area (within eastern Mecklenburg County and along a 0.5-mile boundary around Mallard Creek and the Rocky River). Field studies were not undertaken as part of this EA.

According to the NHP (see NHP April 1999 letter in Appendix B), several SNHAs are found in the counties that make up the receiving basin. These SNHAs are listed on page A-18 in Appendix A and may or may not be within the defined receiving basin for the project.

Fishery Habitat and Aquatic Resources

Rocky River supports an important recreational fishery and is known for its flathead catfish fishery. Other fish species caught include sunfish, carp, crappie, and largemouth bass. Both hook and line fishing and grabbling (taking fish by hand) are popular. Rocky River grabblers have reported catching flathead catfish in the range of 30 to 60 pounds. Grabbling exposes citizens to prolonged contact with the waters of the Rocky River.

The NC Wildlife Resources Commission, in their Fisheries Management Plan for the Basin, identified fish species in the four basic stream habitats in the watershed: coldwater, coolwater, warmwater of the Piedmont, and warmwater of the Coastal Plain. The warmwater streams of the Piedmont, which are more turbid and generally support fewer game fish than the coolwaters of the foothills, contain various sunfish, catfish, minnows, and suckers.

Although seven mainstream reservoirs are located on the mainstem of the Yadkin-Pee Dee River, none are located within the project receiving basin area. Many small lakes and thousands of ponds are scattered throughout the basin. Impounded waters generally provide a warmwater fishery consisting of largemouth bass, crappie, other sunfish, catfish, and miscellaneous species (WRC, March 1998).

The unimpounded lower 16-mile section of the Pee Dee River in North Carolina supports an anadromous fishery for species including American shad, striped mullet, striped bass, and an occasional sturgeon (both the Atlantic sturgeon and the federally endangered shortnose sturgeon). Anadromous fish from the Atlantic Ocean ascend the Pee Dee River for a distance of 195 miles to spawn in the large rocky shoals downstream of Blewett Falls Dam. This dam limits the access of anadromous fish to the Rocky River. One catadromous species, the American eel, is abundant in the lower Pee Dee River (WRC, March 1998).

Fishing pressure and angler utilization of the fishery resource varies within the basin. Very heavy fishing pressure and harvest occurs on mainstream reservoirs. Stream fishing pressure is moderate to heavy on cold and coolwater streams. Fishing pressure is light on most of the warmwater streams where low populations of game fish occur due to persistent water turbidity (WRC, March 1998). Non-point source pollution is a major contributor to water quality problems in the Rocky River (DWQ, 1997).

Rare and Protected Species or Habitats

A total of 14 endangered, threatened, special concern, or significantly rare aquatic species (fishes and mussels) occur in waters within the Yadkin-Pee Dee River Basin, and several other non-aquatic threatened and endangered amphibians, mammals, and plants occur along stream banks in the Basin. There are several additional rare animal species that exist in the basin that require pools or ponds in floodplains for all or part of their lifecycles, including rare amphibians like the mole salamander, four-toed salamander, and bog turtle (WRC, March 1998; DWQ, 1997).

A review of NHP and USFWS records (see Threatened, Endangered, and Sensitive Species in Receiving Basin Table in Appendix A [Table A-12]) indicates a total of 17 sensitive plant and animal species potentially occurring within the receiving basin project area. Specific locations and species types within the precise boundaries of the receiving basin cannot be determined without a field survey.

Species in these categories, as well as protected habitats in the area, are described below.

Schweinitz's sunflower. As mentioned in Section 3.1.3.1, Schweinitz's sunflower (*Helianthus schweinitzii*) is a federally listed endangered plant species that is endemic to the upper Piedmont area of North Carolina. There are several known locations of this species within the eastern Mecklenburg County receiving basin project area. Even though there are other populations of this species along several tributaries to the Rocky River, none are located within the 0.5-mile project area surrounding the Rocky River (NHP, 1999).

Schweinitz's sunflower occurs in relatively open habitats – early successional fields, forest ecotonal margins, or forest clearings. It thrives in full sun but also grows in the light shade of open stands of oak-pine-hickory. Schweinitz's sunflower generally occurs in moist to dry clay soils or soils that are clay-loams or sandy-clay loams with high gravel content. Formerly, the species probably occurred in prairie-like habitats or oak savanna maintained by fires set by lightning or Native Americans. Loss of this open habitat to fire suppression and urbanization has resulted in the decline of the species and its reduction to marginal and vulnerable sites such as roadsides, power line easements, and old pastures. Rapid urban growth in the Charlotte metropolitan area is continuing to convert Schweinitz's sunflower habitat to urban and suburban uses. Several populations have been bulldozed in recent years for road improvements, pasture development and clearing for urban land uses (USFWS, 1994).

Although listed as endangered by the USFWS and the NC Department of Agriculture's Plant Conservation Program, such listing provides only limited protection since neither law protects the species from destruction by the landowner. In addition, Schweinitz's sunflower requires active management to maintain optimal habitat and cannot be "left alone" in a static habitat (USFWS, 1994).

Savannah lilliput. The Savannah lilliput (*Toxolasma pullus*) is a freshwater mussel that is listed as a species of concern by the federal government. It is found in both the North and South Forks of Crooked Creek. Only a very small segment of the headwaters to the North Fork are within the project receiving basin. Besides the Crooked Creek population, the lilliput exists in only two other locations within the Yadkin-Pee Dee Basin. This species, like

the other mussels listed for the project area, is in decline (see WRC 3/99 letter in Appendix B).

Kinea Slate & Rock Hole Creek Natural Areas. The Kinea Slate & Rock Hole Creek Natural Areas are SNHAs, as classified by the NHP. These sites are located on the north side of the Rocky River, below the Town of Stanfield, in Stanly County (NHP, 1999). As shown on the Sensitive Species table in Appendix A (Table A-12), this natural area contains five rare and endangered plant species.

In total, there are 5 known SNHAs and wildlife sanctuaries, one rare natural community, 17 sensitive animal and plant species (including the endangered Schweinitz's sunflower), and important recreational fishery species in the receiving basin.

3.2.3.2 Primary Consequences

The IBT itself will not have any direct impacts on natural communities, SNHAs, fisheries, or sensitive species and their habitats in the receiving basin since no construction is planned with the IBT.

3.2.4 Water Quality / Water Resources

3.2.4.1 Existing Environment

The surface waters of the receiving basin include the Mecklenburg County portion of the Yadkin River in Subbasin 030711, including a segment of Mallard Creek below the CMUD/Mallard Creek WWTP, and a section of the Rocky River in the Yadkin-Pee Dee River Basin (from the confluence of Mallard Creek to NC 205, near Oakboro). These surface waters are part of subbasins 030711, 030712, and 030713 (Figure 5).

Upper Rocky River

DWQ ambient monitoring stations for the surface waters in the study area are shown in Figure 5. The upper reach of the Rocky River and its tributaries in subbasin 030711, including Mallard Creek, drain the populous area of eastern Mecklenburg County. Mallard Creek is an urban stream that receives the discharge of CMUD/Mallard Creek WWTP. There are no ambient monitoring stations on Mallard Creek. However, Good/Fair (in 1985) and Good (in 1996) biological ratings were given to Mallard Creek below the CMUD/Mallard Creek WWTP (DEHNR, 1997).

Middle and Lower Rocky River

The Rocky River, below the confluence of Mallard Creek, follows a Z shape in subbasin 030712 (Figure 5). This segment of the Rocky River drains the watersheds of Irish Buffalo Creek, Dutch Buffalo Creek, Anderson Creek, Muddy Creek, Clear Creek, Goose Creek, and Crooked Creek. This section of the Rocky River receives the discharge of the Rocky River Regional WWTP.

There is an ambient monitoring station (at US 601) in this section of the Rocky River, near Concord. This ambient station monitors water quality conditions in this middle section of the river. There are no additional monitoring stations in the remainder of the segment of the Rocky River in our study area. The ambient data indicate concentrations above the NC action levels for copper, iron, and zinc. The same parameters have been reported in similar concentrations upstream, in the Rocky River at NCSR 2420 near Davidson. These

parameters are included as action levels versus standards in the State rules because total recoverable measurements for these parameters are not necessarily indicative of toxicity related problems associated with bioavailable fractions of the metals. Good-Fair water quality conditions were given to this section of the Rocky River (DEHNR, 1997).

CMUD, the Water and Sewer Authority of Cabarrus County, and the Union County Public Works Department are currently exploring the possibility of locating a regional water reclamation facility (Three-County Water Reclamation Facility) in the Rocky River. Although the location of the facility has not been determined yet, possible locations extend from near Muddy Creek (Cabarrus County) to downstream of Crooked Creek (Union County). Further downstream from NC 205, the Rocky River at Norwood has consistently received high Good-Fair (borderline Good) or Good ratings.

Currently, there are no flow gage stations located within the study area of the receiving basin. However, two new flow gage stations are planned to start operation within the next twelve months within the study area. The USGS operates a gage near the mouth of the Rocky River at Norwood (USGS Station 02126000). According to the DWR, the following flow statistics have been provided at this site: Drainage Area = 1,372 square miles; 7Q10 = 42 cfs; and Average Flow = 1,333 cfs. Based on this information and in consultation with USGS and DWR (personal communication with Mr. Curtis Weaver and Mr. James Mead), the following flow statistics were estimated in the Rocky River, downstream of Crooked Creek at NCSR 1001 (UGGS Site 0212476775): Drainage Area = 683 square miles; 7Q10 = 21 cfs; and Average Flow = 663 cfs.

303 (d) Listed Streams

According to the NC 303 (d) list, North Fork Crooked Creek is the only stream listed as impaired in the study area. The stream was included on the 303(d) list based on biological data, and a chemical parameter has not been identified. Several tributaries adjacent to our study area have also been listed as impaired. Relevant 303 (d) listed streams are: Coddle Creek, Goose Creek, Crooked Creek, , and South Fork Crooked Creek. These streams are listed as being impaired by a combination of point and non-point sources.

3.2.4.2 Primary Consequences

The transfer of water will result in additional wastewater being discharged into the receiving basin through the CMUD/Mallard Creek WWTP (existing) and the Rocky River Regional WWTP (existing). It is estimated that approximately 26 cfs (or 17 mgd), including a portion of the grandfathered amount, will be added cumulatively to the Rocky River from these point sources (at existing permitted capacity).

Based on consultations with USGS, DWQ, and DWR, the additional flow will result in a total stream flow of approximately 47 cfs in the Rocky River (below the confluence with Crooked Creek) under 7Q10 flow conditions. Current 7Q10 stream flow at this point of the Rocky River is estimated to be 21 cfs. The additional flow will bring the stream flow in the Rocky River closer to desirable stream flows designed to maintain aquatic habitat. Based on a regression equation developed by DWR to determine the minimum flow for a stream in the Piedmont which exhibits moderate aquatic habitat, and for which no continuous gage record exists, the recommended minimum stream flow to maintain aquatic habitat in the Rocky River (below Crooked Creek) is 58 cfs. According to guidance provided by DWR and

consultations with Mr. Mead of DWR, the Rocky River near Crooked Creek is considered within the piedmont region for application of the equation. cursory visual inspection of this section of the Rocky River by CH2M HILL staff indicated that the stream provides moderate aquatic habitat. As previously discussed, the middle and lower sections of the Rocky River have received Good-Fair to Good biological ratings (DEHNR, 1997).

Primary impacts to water quality from the IBT originate from the operation of wastewater treatment facilities. However, these facilities have been already permitted and the IBT will not result in additional permitted capacities. Existing NPDES permits were issued to protect instream water quality. The permitting process for each of these facilities has complied with the NCEPA requirements. DWQ's antidegradation policy requires that only the alternative that causes the least amount of environmental damage can be permitted under the NPDES program.

Current efforts to develop a water quality model for the mainstem of the Rocky River from Mallard Creek to Norwood are being pursued by cooperative effort between WSACC, CMUD, Union County, and DWQ. The water quality model will allow the assessment of the interaction in the Rocky River among existing discharges and proposed facilities not related to this IBT permitting process.

Direct impacts related to flooding and streambank erosion due to an increase in stream flow are not expected to be significant. Again, the permitted NPDES flows will handle the proposed IBT flow amounts. Average annual stream flow in the Rocky River, downstream from Crooked Creek, is expected to increase from 663 cfs to approximately 690 cfs at permitted flows, or about 4 percent. The expected increase is minor and well within the historical stream flow variability based on a flow duration analysis conducted in conjunction with the Raleigh Office of USGS. For this analysis, stream flow variability for the Rocky River below Crooked Creek is assumed to be similar to that at the Norwood gage station. The analysis estimated that flows in the Rocky River, below Crooked Creek, historically exceed 690 cfs twenty percent of the time and 1,500 cfs ten percent of the time. The one-year flow event in the Rocky River was estimated at about 6,000 cfs ; therefore, the potential flow increase is less than 0.5 percent of the one-year flow event.

Finally, the ratio of the additional wastewater (26 cfs) to the drainage area of the Rocky River (683 mi²), below Crooked Creek, is less than 0.4. DWR has asserted, based on studies conducted in Piedmont streams (DWR, 1987), that floodwater carrying capacity, streambank erosion, and fish habitat need not be considered in detail for NCEPA documentation or for NPDES permit decisions when the aforementioned ratio is less than 0.40. In light of the above, the proposed additional flow is not expected to result in significant flooding and/or additional streambank erosion from current levels. Therefore, further analyses, such as stream flow modeling or estimates of streambank erosion, were not deemed necessary.

3.2.5 Air Quality

3.2.5.1 Existing Environment

According to the *1998 State of the Environment Report: Mecklenburg County, NC* (MCDEP, 1998A), the overall ambient air quality has steadily improved since 1980. An AQI is used to report ambient air conditions, and the AQI categories include good, moderate, unhealthy, very unhealthy, and hazardous. Through 1998, Mecklenburg County index levels had not

exceeded the unhealthful range, with most reports indicating the air quality is good or moderate. The county had been a non-attainment area for ozone and carbon monoxide but was redesignated in 1995 as an attainment area.

A new, more stringent NAAQS for ozone was established by the EPA in 1997, and the greater Charlotte-Mecklenburg region has been struggling to meet this new standard. The new 0.08 ppm eight-hour average standard took effect in 1997; however, on May 14, 1999, a federal appeals court blocked the EPA from imposing the new standard. The three monitoring sites in Mecklenburg County have been in violation of the new standard for the first two years of data collection (1997 and 1998). If the old standard 0.12 ppm one-hour average is considered, two Mecklenburg County sites are currently in violation of this standard. Regardless of the court battle, Mecklenburg County and the surrounding areas will likely be classified as a non-attainment area for ozone. Once the attainment level is determined, the non-attainment contingency plan will be reviewed and implemented over an anticipated two to five year time frame.

Ozone is not directly emitted, but is formed when sunlight reacts with VOCs and NO_x. According to the NC Air Awareness program, NO_x is the limiting factor on the formation of ozone in North Carolina because of the abundance of naturally occurring VOCs from trees, which cannot be controlled. In North Carolina urban areas, more than 60 percent of NO_x emissions are from automobiles.

3.2.5.2 Primary Consequences

There is no construction associated with the IBT, and the additional discharge to the Rocky River Subbasin due to the IBT will not affect air quality. Therefore, there are no primary air quality impacts.

3.2.6 Groundwater Resources

3.2.6.1 Existing Environment

Mecklenburg County is located in the physiographic region described as the Piedmont region, which is between the Blue Ridge and the Coastal Plain regions. According to the North Carolina Cooperative Extension Service, the crystalline bedrock aquifer in the Piedmont region has relatively little storage capacity, and the well yields tend to be low (around 5 to 35 gal/min). The USGS indicates that the major groundwater related issues in North Carolina are (1) declining water levels (especially in the Coastal Plain region); (2) contamination from hazardous wastes and landfill leachate; and (3) effects of land use on water quality (especially the effects of urbanization). While groundwater is used by individuals and some community systems in Mecklenburg County, it is not an appropriate source for centralized use by CMUD because of insufficient yield and the costs associated with combining surface and groundwater resources.

According to the *1998 State of the Environment Report for Mecklenburg County* (MCDEP, 1998A), most of the wells used for water supply are located in rural areas; however, there are private and community wells located within CMUD's water supply service area. Based on the ambient groundwater sampling network for Mecklenburg County, the 1997 average values are within the suggested EPA drinking water levels except manganese and iron. Manganese is not known to have a toxicological effect, and the recommended limit is based

largely on aesthetic and taste considerations. The recommended limit on iron is also based on aesthetic and taste considerations and not physiological effects.

In 1997 there were more than 700 known or potential sources of groundwater contamination in Mecklenburg County (according to the MPL). As of December 1997, MCDEP had evaluated 225 sites with 146 of the sites identified in areas where groundwater is accessed as a potable source. The western portion of the county has the highest number of MPL sites, while the southern and eastern portions have the least. The highest concentration of sites is located in Uptown Charlotte; however, groundwater is not used as a drinking water source. The 28214 zip code, directly west of Uptown to the Catawba River, has the highest number of MPL sites per given zip code and is the area of greatest concern because many residents use groundwater as a drinking water source.

3.2.6.2 Primary Consequences

There is no construction associated with the IBT, and the additional discharges of water will not affect groundwater resources. According to *Basic Elements of Ground-Water Hydrology with References to Conditions in North Carolina* (Heath, 1980), groundwater recharge occurs by precipitation in all inter-stream areas (areas except along streams and their adjoining flood plains). Streams and flood plains are, under most conditions, discharge areas for groundwater; therefore, there are no primary impacts to groundwater resources due to the project.

3.2.7 Noise Level

3.2.7.1 Existing Environment

Quiet is conducive to psychological and physiological well-being for humans. Just as excessive noise has been documented to negatively affect human health and welfare, elevated noise levels from human activities can disrupt the normal behavior patterns of wildlife, interfering with migration, breeding, hunting, and predator avoidance.

The receiving basin currently exhibits the day-to-day normal noise conditions representative of forested and open land cover areas. With the growth that is anticipated in the area, the noise level will increase temporarily during construction of new subdivisions, homes, and commercial development. A long-term increase in noise levels can be expected due to increasing mobile source traffic.

3.2.7.2 Primary Consequences

There is no construction associated with the IBT, and the additional discharge to the Rocky River Subbasin due to the IBT will not affect noise levels. Therefore, there are no primary impacts expected due to noise.

3.2.8 Toxic Substances/Hazardous Wastes

3.2.8.1 Existing Environment

There are no operating hazardous waste disposal sites in Mecklenburg County; however, the *1998 State of the Environment Report: Mecklenburg County, NC* (MCDEP, 1998A) reports that there were 14 TSDs and 12 transporters of hazardous waste in 1997. Approximately 19.0 million pounds of hazardous waste was generated in 1997 by 59 large generators and 313

small generators. There were 442 conditionally exempt generators that reported to the State of North Carolina in 1997.

Potential sources for toxic substances present in the source basin study area are agricultural-related substances such as fertilizers, weed control chemicals, and pesticides. Other common toxic substances are employed in the construction of homes and commercial buildings such as glues, solvents, and paints. Typical household hazardous wastes would include oils, cleaners, solvents, paints, herbicides, and fertilizers.

3.2.8.2 Primary Consequences

There is no construction associated with the IBT. The additional discharge to the Rocky River Subbasin due to the IBT could affect the release of toxic substances and hazardous wastes through the operation of the proposed Three-County, Rocky River Regional, and Mallard Creek WWTPs; however, these impacts will be addressed individually with separate EA or EIS documentation before the plants are permitted under the NPDES program. Potential toxic impacts from these plants are expected to be insignificant.

SECTION 4

Secondary and Cumulative Impacts in the Receiving Basin

This section provides a broad evaluation of the potential secondary³ and cumulative⁴ impacts that may result from development facilitated by the proposed action. Secondary and cumulative impacts are only expected to occur in the receiving basin portion of the study area. This section contains a general overview of the potential indirect impacts and is not site-specific to the receiving basin. This broad evaluation considers the potential general impacts of growth, on a large scale, associated with full buildout of eastern Mecklenburg County, including the development of water and sewer lines, other public infrastructure projects, and private development. A build out scenario is being considered as a conservative assumption representing a “worst case” scenario. The secondary and cumulative impacts of buildout are discussed because the IBT approval is an important step in facilitating development. It must be emphasized that the IBT is one of several projects being implemented to accommodate growth. Other related projects include construction of the Outer Loop (I-485), and the expansion of Huntersville Park and UNC Charlotte.

The discussion provided in the following section reflects a general analysis of the potential for urbanization to impact specific resources in the receiving basin, given current trends and literature records. This analysis is broad and may reflect a “worst-case” scenario that does not take into consideration current regulations or proposed programs that are attempting to mitigate the impacts. An evaluation of existing federal, state and local regulations is therefore provided in Section 6 to identify areas where improvements may be made to better address the identified potential secondary and cumulative impacts discussed below.

4.1 Secondary Impacts

4.1.1 Installation of Water and Sewer Lines

Growth that will be facilitated by the proposed IBT will necessitate the approval, construction, and operation of a variety of additional water and sewer projects in the receiving basin portion of eastern Mecklenburg County. Although many major water lines are in place, the provision of water may induce demands for additional water distribution and municipal wastewater collection systems in the receiving basin, given the following:

- Regional soils are often unable to handle on-site septic systems.
- Many existing package treatment plants in the area are contributing to declines in water quality due to improper operation and limited treatment.

³ “Indirect Effects” (secondary impacts) are “caused by and result from the proposed activity although they are later in time or further removed in distance, but they are still reasonably foreseeable.” (15A NCAC 1C .0101(d)(4))

⁴ “Cumulative Effects” are defined as “resulting from the incremental impact of the proposed activity when added to other past, present, and reasonably foreseeable future activities regardless of what entities undertake such other activities.” (15A NCAC 1C .0101(d)(2))

- Mecklenburg County discourages the construction of additional package wastewater treatment plants in the region (Mecklenburg, 1990A, 1992, 1996).
- The provision of public water and sewer to eastern Mecklenburg County is a high priority goal for the County, one which must be provided to serve planned full development of the area.
- DWQ may not permit additional package treatment plants in the receiving basin due to low flow conditions in many streams of the receiving basin.

Although new water and sewer lines will occur as a result of the IBT, existing wastewater treatment plants in the receiving basin (CMUD's Mallard Creek in Mecklenburg County and the Rocky River Regional WWTP in Cabarrus County) will not require expansions in order to process the increased wastewater flows. Potential environmental impacts from these additional permitted flows were previously evaluated prior to DWQ issuing the original NPDES permits for the facilities. Additional environmental review of these additional discharges are therefore not necessary.

Constructing and operating water and sewer lines in the receiving basin (considered a secondary impact of the IBT) may have direct environmental impacts. However, due to a lack of specific details regarding these potential future projects at this time (including their type, size, location, design, operational details and information on the potential environmental resources they may impact), this EA cannot adequately address the potential direct impacts of these future infrastructure projects. These impacts may or may not be found to be significant, once adequate details are known. The direct impacts will be assessed during the planning and environmental review phase of specific projects. Secondary and cumulative impacts are being assessed in this document.

To ensure the full evaluation of the potential direct effects of these future projects, Section 6 contains specific recommended elements that should be discussed in future EA and EIS documents for these projects. These conditions recognize the sensitive environmental resources present in the receiving basin and will remind state agencies, the project applicant and their consultant of the areas where special attention is needed to adequately address the potential primary impacts of these subsequent projects.

4.1.2 Buildout of the Receiving Basin

Mecklenburg County's existing policies accommodate urban growth over the entire County (see Section 3.2.2). The regional transportation improvements planned for the receiving basin, including the new I-485 outer loop, the new I-74 Bypass and local thoroughfare improvements, have been collectively planned to accommodate growth. The availability of municipal water or sewer services in the project area is a component of the planning for growth.

The absence of an IBT in eastern Mecklenburg County by itself will not remove the impediment to growth in the receiving basin. However, the subsequent installation and operation of the water and sewer lines as a secondary effect of the IBT, in combination with other infrastructure projects, may change the pattern and rate of growth. Although some urban development has occurred in the receiving basin without public water and sewer services (through the installation of private or community wells and septic tanks or package

treatment plants), the provision of water and sewer systems may lead to more intense land use types and densities than currently possible on limited capacity private systems.

Changes in land uses facilitated by the proposed IBT, combined with the cumulative effects of road construction and development of other urban infrastructure and public services, could create potentially significant direct, indirect and cumulative impacts on environmental and human resources in the receiving basin, as discussed in detail below and in Section 4.2.

Therefore, the most significant indirect impact of the proposed IBT is predicted to be growth and development in the rural parts of eastern Mecklenburg County composing the project's receiving basin. Growth will not be facilitated in the river corridor portions of the receiving basin within Cabarrus, Union and Stanly County, since those areas will not receive any of the transferred water from the IBT.

4.1.2.1 Wetlands

As discussed in Section 3.2.1, wetland habitat found in the eastern Mecklenburg portion of the receiving basin includes 1,723 acres of Piedmont/Low Mountain Alluvial Forest and Upland Depression Swamp Forest. Dense urban development in eastern Mecklenburg County, as possible through full build-out of the area, could have significant impacts on these wetlands. Impacts could be direct, in terms of filling or draining of wetlands for construction of roads, building sites, or utilities. Urban development could also have significant indirect impacts to wetlands, in terms of increased levels of silt and sediment from grading activities and the increasing amount of non-point source pollutants entering into the wetlands over the long term from upland development activities and urban land uses.

Typical urban stormwater pollutants include sediment, nutrients (nitrogen, phosphorus), bacteria (fecal coliform as indicators), and potential toxicants (metals, oil and grease, hydrocarbons, pesticides). It is widely accepted that in general, increased amounts of stormwater runoff from elevated impervious surfaces in developed areas could cause erosion and collapse of streambanks, leading to loss of riparian canopy trees and degraded stream habitat.

The NC Wetland Restoration Program showed that in subbasins 11 and 12 of the Yadkin-Pee Dee River, there were 19 acres of wetlands drained or filled due to development activities during 1996 and 1997 (WRP, 1998B). The acreage of wetlands impacted by growth may increase as the level and intensity of land use changes increase in the basin.

4.1.2.2 Land Use

As discussed in Section 3.2.2.1, the most prevalent land cover type in this area was forest as of 1996. At that time, there were a total of 7,662 acres of high and low intensity urban development, 57,948 acres of forest, 1,883 acres of agricultural cropland and pasture, and 21,705 acres of vacant shrubland in this area. Approximately 10,000 acres of the Mecklenburg County portion of the receiving basin contains prime agricultural soils. In addition, this area contains many important archaeological sites with significant native resources.

Mecklenburg County's development policies for the receiving basin involve accommodating growth and full urbanization of the region through the next century. This growth and urbanization, including land use changes and other effects of land development, could cause significant secondary impacts to rare forest resources, prime agricultural land, and archeological resources in the receiving basin.

Impacts of land use changes could include the loss of the resource to conversion of the land to urban uses. For example, the loss of forest land and open shrub land not only means a loss of timber resources, but means the loss of wildlife habitat, which can have significant impacts to various sensitive species in the area (see Section 4.1.2.3 for a discussion of this impact on fish and wildlife species). Impacts of land use changes could also include a degradation of the resource through the introduction of incompatible urban land uses adjacent to the resource. For example, the loss of viable farm income can occur when subdivisions are built adjacent to farmland and new residential growth forces the farmer to stop using chemicals, vandalism of crops begins to occur, associated farming businesses move away, and the use of farm equipment on public roads in the area becomes more dangerous with increased traffic. In addition, because the value of the farmland rises as urbanization of the area occurs, farmers can be forced out of the business due to increased property taxes.

4.1.2.3 Fish and Wildlife Resources

As detailed in Section 3.2.3, a total of 17 sensitive plant and animal species, many fish species, and several Significant Natural Heritage Areas may exist in the receiving basin project area. Urban growth in the Mecklenburg County area in the past has been shown to negatively affect wildlife resources, fisheries resources, and sensitive species through direct habitat loss and water degradation from point and non-point source pollution sources. Further urbanization of the region may have significant impacts on fish and wildlife resources through the continued:

- loss, fragmentation or degradation of sensitive and non-sensitive aquatic and terrestrial species and their habitats through conversion of land and wetland areas and filling or piping of streams and creeks for residential, business or public facility uses;
- degradation of water quality and negative impacts on aquatic resources, fisheries and wetlands through increasing erosion and sedimentation from construction activities, as well as increased stormwater runoff containing high levels of non-point source pollutants;
- degradation of air resources through increased automobile usage and traffic congestion related to urban sprawl; and
- loss of species diversity through the combined impacts listed above.

As discussed by the USFWS in their restoration plans for sensitive species in the project area, both the water quality and sensitive species aquatic habitat in the receiving subbasins may be significantly impacted through the increase in stormwater, increased sedimentation and erosion, loss of streambanks, and increased amount of non-point source pollutants entering into the surface waters as urban land uses replace rural land uses in the project area. Further loss of terrestrial natural communities to urban development is a concern,

since many of the threatened or endangered species in the basin are vascular plant species living on marginal habitats (such as the Schweinitz's sunflower) (USFWS, 1994, 1997).

4.1.2.4 Water Quality / Water Resources

According to the *Mecklenburg County State of the Environment Report* on water quality (see Appendix D), the streams in the project receiving basin show a declining trend in water quality due to point and non-point source pollutants from urban development. As discussed in earlier sections, the Crooked Creek watershed, whose the headwaters are located in the project receiving basin) have a substantial portion of its streams classified as impaired specifically due to the impacts of urbanization (WRP, 1998A).

Dense urban development from full buildout of the receiving basin may continue this downward trend for water quality in the receiving basin. Potentially significant indirect or secondary impacts on water quality and aquatic habitat in areas adjacent to and downstream of the receiving basin area may occur with full urbanization. North Fork Crooked Creek in the receiving basin has already demonstrated water quality impairment due to the secondary impacts of current urban growth in the project area.

Short-term declines in water quality from installation of sewer and water lines, public facility construction projects, and long-term declines in water quality from land use changes may have significant impacts on water quality and subsequent impacts on aquatic habitat, wetlands, and sensitive aquatic and amphibian species in eastern Mecklenburg County. The source and impact of water quality degradation was previously discussed in Sections 4.1.2.1. through 4.1.2.3.

Changes in land use have a major effect on both the quantity and quality of stormwater runoff. Urbanization and land use development, if not properly planned and managed, can dramatically alter the natural hydrology of an area. Impervious surfaces increase the volume and rate of stormwater runoff. These changes lead to more frequent and severe flooding and also lead to degradation of water quality from the various stormwater pollutants that wash off impervious areas during rain events (e.g. sediments, nutrients, bacteria, etc.). As imperviousness increases, the more impacted surface waters become from pollution and flooding. The cumulative effects of stormwater runoff are evident in the frequent correlation between the location of a stream and its water quality, where urban streams overall have poorer water quality than rural streams.

One major positive secondary impact of the IBT and the construction of regional public water and wastewater collection systems in the receiving basin will be the eventual elimination of privately owned package treatment plants, potential reductions of discharges into low flow streams from existing public WWTPs, adequate maintenance of sewer lines to prevent overflows, and public enforcement actions on failing septic systems that will together protect surface waters from discharges of wastewater in the project area.

4.1.2.5 Air Quality

Ozone is the primary pollutant of concern in the study area, and the levels of ozone in the study area will likely be affected by the projected increasing growth. Since NO_x is the limiting factor in ozone formation, and an estimated 60 percent of NO_x is emitted by

automobiles, the additional vehicle miles traveled due to increased population will likely result in higher concentrations of ozone formed during the hot summer months.

4.1.2.6 Groundwater

Development of most urban areas has followed major roads. These roads facilitate the installation of water supply systems from municipal sources. This is expected to be the case during development of the receiving basin. CMUD plans to supply water to 100 percent of Mecklenburg County in 2020; however, until then, a small number of dwellings in the periphery of urban areas and in isolated subdivisions will continue to depend on individual groundwater wells for water supply.

A potentially negative impact to groundwater availability is the reduced infiltration capacity due to increase of impervious areas as a cumulative impact of full build-out of the project area—thus affecting the recharge capacity of the groundwater storage.

Land use activities and growth in the receiving basin could potentially impact groundwater quality by introducing toxic contaminants into or onto the soil, where it can seep into the groundwater aquifer. Such contamination can ruin drinking water wells for communities and individual homes. Potential sources of groundwater contamination include wastewater lagoons, solid waste disposal sites, storage or use of hazardous substances, poorly designed or maintained septic systems, accidental spills, and leaking underground storage tanks.

The proposed regional wastewater collection services will capture a significant number of residences presently using septic tanks. This will result in a beneficial impact to groundwater in the study area by reducing the public health risk of groundwater contamination in the service area from leaking or failing septic tanks.

4.1.2.7 Noise

The predicted full urbanization and build-out of the project service area will produce greater amounts of noise from greater density of land uses, more people living in the study area, more businesses and industries operating in the area, and a significant increase in number of vehicles using local roads and highways. As development occurs with the provision of sewers in the project area, existing residential developments, once isolated in the countryside, will be joined by additional subdivision developments next to them. The cumulative effect of lawn mowers, leaf blowers, barking dogs, etc. will rise accordingly. Businesses and industries will move into the area also, potentially bringing elevated noise levels to existing residential areas. The continued growth and development of the study area will significantly impact the community noise levels through the introduction of additional domestic and commercial traffic and intensification of industry. Overall, the project study area will evolve from a fairly quiet, rural area to an urban and suburban area, with greater numbers of noise sources combining cumulatively to raise the base exterior noise level in the area.

4.1.2.8 Toxic Substances / Hazardous Wastes

As urbanization continues in the receiving basin, the potential for release of toxic substances from residential and commercial sources increases. The improper disposal of these substances could have adverse impacts on the environment by entering the groundwater system through landfill leachate or entering the sewer system and reaching the WWTPs.

The Mecklenburg County Engineering Department provides three household hazardous waste (HHW) collection centers at three of the super recycling centers. HHW can properly be disposed of at the North Mecklenburg Collection Center, the Hickory Grove Recycling Center, and the Compost Central Recycling Center.

As the amount of traffic and urban uses in the receiving basin increase, stormwater runoff will contain increasing levels of water pollutants, some of them toxic. Typical urban stormwater pollutants include sediment and silt, nitrogen and phosphorus, oils and greases, rubber deposits, toxic chemicals, pesticides and herbicides, and road salts. Unless contained and treated before entering into surface waters, this urban stormwater could significantly impact the water quality and sensitive species living within the receiving basin.

The long-term impact of new toxic discharges to the surface and groundwaters from urban stormwater, landfill leachate, and accidental and/or intentional spill of household and industrial chemicals in the receiving basin will likely lead to declines in water quality, the potential loss of wildlife, and potentially the elimination of the existing endangered species in the subbasin.

4.2 Cumulative Impacts

Cumulative impacts, related to growth, are expected to be essentially the same as those identified as secondary impacts in the previous section. Full urbanization of eastern Mecklenburg County may cumulatively cause degradation and loss of certain wetlands, forest resources, prime agricultural land, sensitive wildlife habitat, and archeological resources. Conversion of these land uses and the resultant urban development activities that normally accompany these changes in the receiving basin may cumulatively impact water quality and aquatic habitat adjacent to and downstream of this urbanizing area. Streams, lakes, and other surface waters in eastern Mecklenburg County may be impacted by the cumulative effect of urban non-point source pollutants and hydrologic modification. Increased levels of silt and sediment and the increasing amount of non-point source pollutants entering surface waters in the project area from development activities and urban land uses pose a threat to the natural system in the long term.

Long-term declines in water quality from ongoing non-point pollution and stormwater from urban land uses can have significant impacts on aquatic habitat, wetlands and sensitive aquatic and amphibian species in urbanizing areas. According to USFWS studies, such impacts have historically occurred in the Charlotte-Mecklenburg area as a result of urbanization, and may have led to the decline of sensitive aquatic species in the receiving basin (USFWS, 1997; Keferl and Shelley, 1988). In general, unless stormwater is properly managed, and wetlands and stream buffers are protected, erosion and urban stormwater could cause significant cumulative impacts to the water quality and/or the sensitive species living within the project area and in downstream environments (USFWS, 1997; Keferl and Shelley, 1988).

As land uses change and open spaces are developed and cut off from other open areas, fish and wildlife habitat will be lost and fragmented, and species diversity potentially diminished. Loss of terrestrial natural communities to urban development is a particular concern for the sensitive vascular plant species living on marginal habitats (such as the

Schweinitz's sunflower) in the receiving basin (USFWS, 1994). Sensitive terrestrial and aquatic species and their habitats may be lost to development or may be degraded over time by the negative impacts of urban uses in close proximity, especially as a result of degradation of water and air resources. Both the water quality and sensitive species habitat in the receiving subbasins may be significantly impacted through the increase in stormwater, increased sedimentation and erosion, loss of streambanks, and increased amount of non-point source pollutants entering into the surface waters from urban land uses (USFWS, 1997).

Public and recreational lands and waters could receive additional use from an increased population, creating stress on wildlife that are trying to occupy the few natural areas remaining. Urbanization will also increase the base level of noise in the receiving basin, potentially impacting wildlife behavior.

Urbanization of the area will result in a loss of acres of prime agricultural and forest land. Stormwater runoff may increase, causing streambank erosion and increased amount and severity of flooding damage to public and private properties. Archeological and historical sites may be lost to development activities. The additional vehicle miles traveled due to increased population growth will likely result in higher concentrations of ozone formed during the hot summer months. Urbanization in Charlotte has in the past contributed to a decrease in air quality, and this trend is likely to continue as a result of the proposed project.

A potential impact to groundwater availability is the reduced infiltration capacity due to increase of impervious areas as growth continues, thus affecting the recharge capacity of the groundwater storage. Land use activities and growth could also potentially impact groundwater quality by introducing toxic contaminants in recharge areas. The long-term, cumulative impact of new toxic discharges to the surface and ground waters from urban stormwater, landfill leachate, and accidental and/or intentional spills of household and industrial chemicals in the receiving basin could lead to declines in water quality, the potential loss of wildlife, and potentially the elimination of the existing endangered species in the subbasin.

SECTION 5

Alternatives Analysis

Alternatives to the proposed interbasin transfer are discussed below. The three alternatives considered for this EA are:

1. No action
2. Obtain water from the Rocky River Subbasin
3. Discharge water to the Catawba River Subbasin

Table 8 summarizes maximum day water use, wastewater discharge, and interbasin transfer amounts for the proposed and alternative scenarios in 2030. These estimates do not include future growth in the Goose Creek watershed.

TABLE 8
Maximum Day Water Use, Discharge, and Interbasin Transfer (mgd) for CMUD Alternatives in 2030

Alternative	Catawba Water Use	Rocky River Water Use	Catawba WW Discharge ¹	Rocky River WW Discharge ¹	Interbasin Transfer ²
Proposed Action	240	0	165	20	33
No Action	223	0	165	9	16
Obtain Water from Rocky River	223	17	165	20	16
Discharge more to Catawba	240	0	182	3	16

Notes:

¹ Discharge represents the portion of the water used that is discharged to the wastewater system, and is not necessarily the same as actual WWTP discharges.

² Interbasin Transfer includes a consumptive use portion in the receiving basin.

5.1 No Action Alternative

Under the no action alternative, CMUD will not provide additional water/sewer services or increase bulk water sales to customers within the Rocky River Subbasin. Therefore, as shown in Table 8, CMUD's water use and wastewater discharge would decrease compared to the preferred alternative. This alternative would cost less, but revenue from water sales would also decrease. While development in the area would potentially slow because of the lack of centralized water/sewer service, additional growth would still occur. Growth areas would likely be served by individual wells and septic tanks, or by community water systems and package sewer plants. This sustained proliferation of septic tanks and small package plants will pose a detriment to water quality in many streams. Septic tank failure can cross-contaminate groundwater. Bacterial contamination from septic tank effluent has been found to be a common occurrence in suburban and rural areas served by groundwater

because the subsurface water is being used both as a source of drinking water and as a disposal medium for wastewater.

5.2 Obtain Water from Rocky River Subbasin Alternative

One option for CMUD is to develop a water supply source in the Rocky River Subbasin so that the interbasin transfer amount does not increase from the grandfathered amount of 16.1 mgd. This would require development of a water source to supply 17 mgd on an average annual basis. The site considered for this analysis is just upstream of the Rocky River Regional WWTP with a drainage area of approximately 100 square miles. Planning level costs for constructing a similar-sized reservoir, the Little River Reservoir in Wake County, to supply 18 mgd are about \$54 million. If this cost were prorated for the 17 mgd Rocky River Reservoir, the total costs for a Rocky River Reservoir could be expected to be about \$51 million (reservoir only, pumping and transmission costs depend upon length of pipeline). The Rocky River and its tributaries are not classified as water supply waters, so water supply watershed protection measures are not in place and there are numerous point source discharges upstream of the potential reservoir site. Development of a new water treatment plant would be more expensive than expanding the existing WTPs in the Catawba River Subbasin, and treatment costs would be higher since the Catawba River lakes are very high quality and are protected as water supply sources. The regulatory requirements for developing this source would be substantial.

Proposals for development of new impoundments for water supply in rapidly urbanizing watersheds have faced significant regulatory requirements and created considerable public controversy. The Randleman Lake project in the Deep River portion of the Cape Fear River Basin has faced significant regulatory and public hurdles. Concerns have focused around adequate protection of public health with an urban/urbanizing watershed to loss of rural land. These issues are exacerbated by the fact that this area has never been identified as a potential water supply watershed and there has been no effort to protect the watershed for this purpose. In contrast, the Little River Watershed in Wake County (mentioned above) has been protected through local ordinances and state stream classification as a water supply source since the mid-1980s. The Little River reservoir is not planned to be developed until after 2010.

5.3 Discharge Water to Catawba River Subbasin Alternative

For comparison purposes it is assumed that CMUD would substantially expand the McAlpine WWTP as an alternative to using WWTPs in the receiving basin, and a new regional facility is not constructed in the Rocky River. WWTP expansion costs would be about the same and perhaps more expensive due to the many generations of existing facilities at McAlpine WWTP. Transmission and pump station costs for 17 mgd (estimated required maximum month capacity under this alternative) would be about \$10.5 million. SC DHEC has expressed concerns with DENR about nutrient levels in the Catawba Basin, specifically the levels of phosphorus from dischargers in the Sugar Creek Basin. Point source loading estimates indicate that the phosphorus load from CMUD's McAlpine Creek plant is approximately 900 lbs/day at current capacity. The total phosphorus load from all South Carolina discharges in the Catawba Basin is approximately 900 lbs/day as well. SC DHEC

considers the CMUD McAlpine Creek plant to be a significant end of pipe contributor to phosphorus in the basin. SC DHEC has indicated that they would be very concerned if the phosphorus loading from McAlpine Creek is increased substantially. SC DHEC has written correspondence with DENR requesting phosphorus limits on this discharge. SC DHEC is in the process of developing a TMDL for the Catawba River Basin and has requested DENR's cooperation in this effort.

SECTION 6

Mitigation of Adverse Impacts

The proposed maximum day IBT of 33 mgd of water from the Catawba River Basin to the Rocky River Subbasin will not have the potential to cause significant direct impacts to the environment, as discussed in Section 3. The IBT, however, may have the potential to significantly impact the environment through secondary and cumulative impacts as a result of facilitating growth in the receiving basin, as discussed in Section 4.

In order to evaluate the significance of the impacts listed in Section 4, we have reviewed existing regulations and programs at the federal, state and local levels to determine if these existing programs may mitigate the anticipated impacts of urbanization of the project area. A discussion of state and federal programs is provided in Section 6.1. A discussion of local programs is provided in Section 6.2.

For those resource impacts where existing programs and regulations could be improved to better mitigate the anticipated secondary and cumulative impacts from the proposed action, additional local government mitigation measures are provided in Section 6.3. To ensure the full evaluation of the potential direct effects of future water and sewer line projects as a secondary effect of the IBT, specific conditions are also included in the list of proposed mitigation measures in Section 6.3. The mitigation items listed in Section 6.3 along with existing regulatory and non-regulatory environmental protection programs support an overall EA and Finding of No Significant Impact (FONSI) under NCEPA for the proposed action.

6.1 Summary of Federal and State Regulations and Programs

The following is a brief description of existing regulations and programs at the federal and state levels in the project receiving basin. The discussion emphasizes the extent to which existing programs may adequately mitigate the anticipated impacts of urbanization of the project area.

This analysis does not attempt to measure the performance of these programs to improve specific environmental conditions in the field. Such an “efficiency” analysis of each of these regulations and programs could determine the exact level of benefit received from the programs. However, an “efficiency” analysis is beyond the scope of this discussion.

Therefore, the following discussion addresses relevant regulations and programs from an environmental management and land use policy analysis perspective. The discussion provides a general overview of the existing regulatory and non-regulatory mitigation framework that protects natural resources from the effects of urbanization. The evaluation is used to identify opportunities for local governments in the study area to enhance environmental protection.

6.1.1 Federal Regulations

6.1.1.1 Endangered Species Act

The 1973 Endangered Species Act conserves ecosystems upon which threatened and endangered species of fish, wildlife, and plants depend, through Federal action and State programs (USFWS, 1992). The Act:

- Authorizes the determination and listing of species as endangered and threatened;
- Prohibits unauthorized taking, possession, sale, and transport of endangered species;
- Provides authority to acquire land for the conservation of listed species, using land and water conservation funds;
- Authorizes establishment of cooperative agreements and grants-in-aid to States that establish and maintain active and adequate programs for endangered and threatened wildlife and plants;
- Authorizes the assessment of civil and criminal penalties for violating the Act or regulations; and
- Authorizes the payment of rewards to anyone furnishing information leading to arrest and conviction for any violation of the Act or any regulation issued thereunder.
- Requires Federal agencies to insure that any action authorized, funded or carried out by them is not likely to jeopardize the continued existence of listed species or modify their critical habitat.

6.1.1.2 Sections 404/ 401 of the Clean Water Act

There are currently two main regulatory programs that control the filling or draining of wetlands in the project area, both of which originate from the Federal Clean Water Act – Section 404, regulation of dredged and fill activities (which is enforced by the U.S. Army Corps of Engineers [ACOE]), and Section 401, certification that a project does not violate the state's water quality standards (which is enforced by DWQ). All private and public construction activities over a specific acreage that affect jurisdictional wetlands are required to obtain required wetlands permits as necessary from DWQ (Section 401 WQ Certification) and from the ACOE (Section 404 Permits).

Although the State's 401 Water Quality Certification Program and the Federal 404 Wetlands Protection Programs afford some protection for wetlands by requiring avoidance and mitigation for wetlands across the state, it is possible for permits to be issued under both the state and federal programs that allow small areas of wetlands to be lost. The NC Wetland Restoration Program showed that in subbasins 11 and 12 of the Yadkin-Pee Dee River (which encompasses the receiving basin project area), there were 19 acres of wetlands drained or filled due to development activities during 1996 and 1997 (WRP, 1998B). The acreage of wetlands impacted by growth may increase as the level and intensity of land use changes increase in the basin.

Inadequate personnel at the state and federal level to enforce the regulations is a common problem in its adequate protection of wetlands. Effective March 1999, DWQ stepped up the enforcement of regulations for wetlands protection, particularly those related to hydrologic

conditions necessary to support wetlands function (15A NCAC 2B.0231(b)(5)), and biological integrity (15A NCAC 2B.0231(b)(6)). DWQ is joined in this initiative by the NC Division of Land Resources which will also be looking at possible violations of the State Sedimentation Pollution Control Act.

6.1.1.3 National Flood Insurance Program (NFIP)

A federal non-regulatory program that may afford some protection to stream riparian areas and wetlands, and also protect water quality by restricting floodplain development, is the National Flood Insurance Program (NFIP). NFIP, which is managed by the Federal Emergency Management Agency (FEMA), was created in the 1960's in response to the rising cost of taxpayer funded disaster relief for flood victims and the increasing amount of damage caused by floods. The NFIP makes federally-backed flood insurance available in communities that agree to adopt and enforce floodplain management ordinances to reduce future flood damage. The NFIP, through partnerships with communities, the insurance industry, and the lending industry, helps reduce flood damage by nearly \$800 million a year.

Floodplain management under the NFIP is an overall program of corrective and preventative measures for reducing flood damage. It includes but is not limited to emergency preparedness plans, flood control works, and floodplain management regulations, and generally covers zoning, subdivision, or building requirements and special-purpose floodplain ordinances. Examples include mapping communities to identify flood-prone areas, elevating buildings above the base flood, and relocating structures out of the floodplain.

An important element in making flood insurance available to home and business owners is a community's agreement to adopt and enforce floodplain management ordinances, particularly with respect to new construction. It is up to local governments to adopt and enforce ordinances that meet or exceed the minimum floodplain management requirements of NFIP (FEMA, NFIP).

All local governments in the receiving basin project area (including Mecklenburg County, Mint Hill, Cornelius, Huntersville, and Davidson) are participating in the FEMA Flood Insurance Program. This program prohibits filling in the floodways. It also limits construction of buildings in the floodplain fringe area unless an engineer certifies that the bottom floor of the structure is at least 5.7 feet above the 100 year flood elevation. The minimum distance is 5.7 feet temporarily because the county is re-mapping its floodplains. Pending the outcome of each basin's re-mapping, in which many of the base flood (100 yr.) elevations are expected to increase, the freeboard above the current base flood elevation (BFE) has been temporarily increased from one foot to 5.7 feet except in the Mallard Creek Basin. Mallard Creek Basin re-mapping is complete; therefore, the freeboard required above the BFE is the normal one foot. Matthews and Cornelius require additional elevation (two feet) above the BFE in their local flood ordinances.

Because of this provision for raising structures, a substantial amount of development (and potentially loss of wetlands) could occur in the floodplain fringe areas, including subdivisions with lot lines extending into the floodway. Recent passage of the Surface Water Improvement Management (SWIM) Program buffer regulations will limit fringe

development. The buffer regulations require that for all FEMA regulated streams (one square mile drainage area and greater), one-half of the fringe area must be preserved for a three-zone buffer. No impervious surfaces may be placed in any of the three buffer zones. Also, the flood fringe area will be effectively reduced by 25% after the re-mapping because the allowable rise in the floodway will be reduced from one foot to 0.1 foot.

6.1.2 State Regulations

6.1.2.1 North Carolina Wetlands Restoration Program (WRP)

This non-regulatory program was created within DWQ to protect and mitigate wetland losses. However, WRP is primarily involved with finding and preserving specimen wetlands of good quality to mitigate specific project impacts (especially as mitigation for North Carolina Department of Transportation [NCDOT] projects) and also restoring existing impaired wetlands. It does not specifically provide a mechanism to protect wetlands on a regional basis from widespread urban development impacts (WRP, 1998A).

The Wetlands Restoration Program has targeted two hydrologic units, 11 and 12, within the project receiving basin for wetland restoration actions. The Goose Creek and Crooked Creek hydrologic units (the headwaters for both of which are located in the project receiving basin) have a substantial portion of their streams classified as impaired due to heavy impacts of urbanization, the presence of package treatment plants, and the presence of sensitive species (WRP, 1998A).

6.1.2.2 Archaeological Protection

Archaeological resources are protected on private and public lands through the NC Archaeological Resources Protection Act, the Unmarked Human Burial and Human Skeletal Remains Protection Act, the NC Archaeological Record Program, the NC Environmental Policy Act and various federal laws. Unfortunately, these laws are only applicable to projects that are state or federally approved, permitted or funded, or exist on state or federal lands. Although this often exempts many private development projects, the ACOE often catches some of these projects since they require archaeological reviews for any project that needs a Section 404 (federal wetlands) permit.

6.1.2.3 Stormwater Regulations

NPDES stormwater discharges are controlled by the federal NPDES regulations, as enforced by DWQ. The program regulates all major discharges of stormwater to surface waters. NPDES permits are designed to reduce or eliminate pollutants in stormwater runoff from certain municipal storm sewer systems and industrial activities by requiring the development and implementation of stormwater management measures.

The NPDES stormwater permitting system is being implemented in two phases. Phase 1 was implemented in 1991 and applied to 6 municipal separate storm sewer systems (MS4s) in NC with greater than 100,000 people. This Phase 1 also applied to eleven industrial categories including construction activities (sites greater than 5 acres). An NPDES permit was issued to each of the 6 municipalities. In addition, the majority of industrial activity sites were covered using General NPDES permits. Currently there are approximately 3,000 sites in NC covered by individual or General NPDES permits. No local governments in the

receiving basin portion of the project area are subject to Phase 1 NPDES Stormwater requirements, although there are probably several industrial sites.

Phase 2 rules were finalized on October 29, 1999 and published in the Federal Register on December 8, 1999. Final rules are still being reviewed; however, the rules are expected to impact between 60 to 100 MS4s in “urbanizing areas” of NC, as well as expanding the coverage for construction activities to sites over one acre. Those subject to the Phase 2 Rule would be required to apply for NPDES permit coverage and to implement stormwater management programs (i.e., best management practices [BMPs]). Small MS4s will be required to develop and implement a stormwater management program designed to reduce the discharge of pollutants to the “maximum extent practicable”, to include six minimum control measures, and include their selection of BMPs and measurable goals for each minimum measure in their permit application. Construction activities requirements will be established by DWQ and will likely be similar to existing State sediment and erosion control plan requirements.

DWQ will evaluate EPA rules when final and establish guidelines and schedules for local government compliance. DWQ will be the enforcement agency for these rules. Applicable local governments will have three years from the date of publication of the final rule to submit the permit application to DWQ for approval. Mecklenburg County will be required to develop and implement stormwater management programs under Phase 2.

6.1.2.4 Erosion and Sedimentation Control

NC Division of Land Resources administers programs to control erosion and sedimentation caused by land disturbing activities on one or more acres of land. Control measures must be planned, designed and constructed to provide protection from the calculated peak rate of runoff from a 10-year storm, except for projects in HQW (High Quality Water) zones, which require control of 25-year storms. Enforcement of the program is at the state level, but can be delegated to local governments (usually counties or large municipalities) with certified erosion control programs. Mecklenburg County enforces its own erosion and sedimentation control program based on state requirements. In early 2000, the Mecklenburg County erosion control program received an award of excellence from the NC Sedimentation Control Commission.

6.1.2.5 Sanitary Sewer Overflows (SSOs)

State regulations (15A NCAC 2B.05.06) require municipalities and other wastewater treatment operators to report wastewater spills from discharges of raw sewage from broken sewer lines and malfunctioning pump stations within 24 hours. DWQ has adopted the following policies, effective July 1, 1998:

Municipalities and other wastewater treatment operators will be fined a minimum of \$ 4,000 if they do not comply with the reporting requirement within 24 hours for all spills exceeding 1,000 gallons that reach surface waters or the ground, regardless of whether they are contained or reach waters. A point system is used to determine whether to assess fines for reported spills.

Wastewater collection system operators were required to prepare a Spill Response Plan Evaluation by July 1, 1998, and an Operation and Maintenance Evaluation of their systems by July 1, 1999. Operators must develop a plan including a schedule to deal with any maintenance and operational deficiencies uncovered. For spills occurring after July 1, 1999 related to maintenance or operational problems covered in the plan, the penalty will be increased.

When a serious spill occurs, wastewater collection system operators could face not only higher fines but also requirements to publish public notices in local media, undergo training, or submit to an injunctive action and/or a moratorium on new connections to the system.

The NC Clean Water Bill of 1999 provides for the development of permits for collection systems that would include requirements for inspections, sewer maintenance and other operational items. DWQ has developed a "shell" Wastewater Collection System Permit and is expected to issue them after July 1, 2000.

In addition, EPA is currently drafting regulations that will address sanitary sewer overflows. EPA has prepared five documents that provide draft language for proposed regulations to establish guidance and/or standard NPDES permit conditions for the following:

- Record keeping, reporting and public notification requirements for SSOs
- Capacity assurance, management, operation and maintenance requirements for municipal sanitary sewer collection systems
- Prohibitions on SSO discharges to waters of the United States
- NPDES permit coverage for satellite municipal sewer collection systems

EPA expects the proposed regulations to be published in the Federal Register in May, 2000 and promulgated by October, 2000.

In addition to the above regulations dealing with SSOs, the following performance standards apply to proposed sewer collection system and pump station permits issued by DWQ:

1. The wastewater collection system shall be effectively maintained and operated at all times so that there is no discharge to land or surface waters, nor any contamination of groundwater.
2. The Permittee must maintain a contingency plan for pump failure at each pump station.
3. The Permittee shall maintain on hand at least one fully-operational spare pump capable of pumping the design flow rate at the appropriate total dynamic head for each simplex pump station that serves more than one building.
4. Each pump station shall be clearly and conspicuously posted with a pump station identifier and an emergency contact telephone number which is able to get to an individual that can initiate or perform emergency service for the collection system 24 hours per day, seven days per week.

5. An infiltration/exfiltration test shall be performed on all newly constructed sewer lines to ensure that the infiltration/exfiltration rate is less than 100 gallons per day per inch of pipe diameter per mile of pipe.
6. At a minimum, an emergency power source or plugged emergency pumping connection shall be provided along with an approved contingency plan for all newly-constructed or modified pump stations.

6.1.2.6 North Carolina Clean Water Management Trust Fund (CWMTF)

The CWMTF was created by the 1996 Legislature to help finance projects that specifically address water pollution problems. It controls a non-regulatory program that focuses its efforts on upgrading surface waters in distress, eliminating pollution, protecting and conserving unpolluted surface waters, and establishing a network of riparian buffers and greenways for environmental, educational and recreational benefits. According to the enabling legislation, 6.5% of the unreserved credit balance remaining in the state's General Fund at the end of each fiscal year is allocated to the CWMTF for disbursement. The minimum amount available must be \$30 million.

Possible use of CWMTF monies could be for wetland and/or riparian corridor identification and preservation (through acquisition and easement techniques) in the receiving basin portion of the study area to allow comprehensive protection of wetlands and riparian buffers in the project area to protect water quality and sensitive aquatic species.

6.1.2.7 Groundwater Protection

Several regulations and programs exist at the state and local levels that protect groundwater from urban growth:

- Wellhead Protection Program
- Regulation of potential contamination sources
- Management of groundwater contamination incidents
- Ambient groundwater monitoring
- Regulation of well construction

These programs may afford some protection to groundwater wells from the most common forms of groundwater pollution – point sources such as chemical manufacturing facilities, underground storage tanks and accidental spills. However, more diffuse and evasive groundwater pollutants from agricultural uses (livestock facilities and chemical application on crops) and urban land uses (over-application of fertilizers and improper use of toxic household chemicals) may not be well managed under these programs.

6.1.2.8 Miscellaneous Incentive Programs

Other, voluntary strategies exist at the federal and state levels that provide incentives to protect natural lands, wetlands, agricultural lands, sensitive species habitat and forest lands from development. These non-regulatory approaches include providing tax credits for donating lands to specific organizations (usually land trusts) and providing funding for various grants and trust funds to purchase or protect undeveloped lands.

6.2 Evaluation of Local Regulations and Programs

The following is a brief description of existing regulations and programs at the local government level in the project receiving basin, with specific effort given to determining if these existing programs may, when combined with existing federal and state regulations, adequately mitigate the anticipated impacts of urbanization of the project area.

As in Section 6.1, the following analysis addresses relevant regulations and programs from an environmental management and land use policy analysis perspective. The evaluation is used to identify opportunities where local governments could improve environmental protection.

6.2.1 Mecklenburg County

6.2.1.1 Voices and Choices

In November 1998, over 800 people attended the Central Carolinas Regional Environmental Summit in Rock Hill, South Carolina to bring focus and emphasis to regional environmental issues in a 14-county area in North and South Carolina encompassing the Charlotte-Mecklenburg metropolitan region (including Cabarrus, Stanly, Union and Mecklenburg Counties and local governments within them). In the spring of 1999, the ongoing Summit process was renamed “Voices and Choices.” This section of the report has been compiled from personal communications with Mr. Rusty Rozzelle and Mr. Craig Miller of Mecklenburg County, Ms. Betty Chafin-Rash and Bill Toole of Voices and Choices, and from information provided at the Voices and Choices website.



The 1998 Summit brought together communities, businesses, environmental and economic growth interest groups and individuals to identify common goals, gain support for sustainable solutions, and determine options and choices for the future. Prominent stakeholders included Mecklenburg County, the City of Charlotte and the Sierra Club.

Participants at the Summit discussed priorities for the region and evaluated various future scenarios or visions for how the area should grow. Several goals were met during the Summit:

- Increase awareness and understanding of environmental issues affecting the region and options for addressing them.
- Develop a broad base of support for sustainable solutions.
- Generate open dialogue among governments, leaders and citizens, and encourage them to work together to achieve desired outcomes.
- Examine alternatives, identify future growth choices and come to consensus on a common vision for the region.
- Develop a regional environmental agenda and create momentum for establishing a post-summit follow through process.

In the spring of 1999, the renamed Voices and Choices formed five Action Teams:

1. Air Quality / Transportation
2. Water Quality
3. Land Use
4. Open Space Protection
5. Recycling / Resource Recovery

The common goals of these Action Teams include:

- Build consensus around the vision of a sustainable, livable and healthy region that protects its natural heritage.
- Educate citizens across the region on environmental assets, issues and risks, with emphasis on the interdependence of a strong economy and environmental protection.
- Identify aligned interests and build partnerships with business, environmental, government, non-profit, educational, and religious institutions and individual citizens.
- Provide a well-organized, adequately financed process for dialogue that enables sometimes disparate interests in the region to find common ground for progress.
- Advocate policies and practices which will make the 1998 Regional Environmental Summit vision a reality.

The focus for each of these Action Teams is presented below.

Air Quality and Transportation Action Team

The goals for the Air Quality and Transportation Action Team include:

- To attain or exceed EPA air quality standards to work towards zero days of non-attainment status
- To develop a regionally planned, efficient and effective regional mass transit system that is multi-modal and has alternative forms of transportation including greenways, bike paths and alternative fuel vehicles.

The Team proposed the establishment of a regional transportation authority to coordinate the four regional metropolitan planning organizations (MPOs). They also proposed to integrate land use planning and transit planning, protect rail corridors as future mass transit system corridors, encourage use of alternative fuels to reduce auto emissions, use more high occupancy vehicle (HOV) lanes and implement incentives for using mass transit options, while discouraging use of single occupancy automobiles. They would build bike and pedestrian paths and lanes throughout the region, establish a public relations and educational campaign on the links between air quality and mass transit, and develop partnerships with business and industry to develop efficient transit systems and encourage employee use of mass transit options.

Water Quality Action Team

The Water Quality Action Team is composed of individuals from the following groups and agencies:

- (MCDEP, Stormwater Services, CMUD, Solid Waste Reduction, Cooperative Extension, and Centralina Council of Government (COG))
- Duke Power Company/Duke Energy
- Mountain Island Lake Association (citizen-based lake conservation group)
- Lake Wylie Marine Commission
- Catawba River Keeper
- DENR (Mooresville Regional Office)
- Town of Stanly Manager
- Gaston County Quality of Natural Resources
- Gaston County Cooperative Extension
- Keep Iredell Clean/Keep America Beautiful
- SC DHEC
- Two local environmental lawyers
- Crescent Resources (Development Division of Duke Power Co.)
- Real Estate and Building Industry Coalition (REBIC)
- University of North Carolina at Charlotte
- Trust for Public Land
- Lake Wateree Home Owners Association
- The Sierra Club
- Unaffiliated concerned citizens

The Water Quality Action Team recognizes that sediment levels are too high in many lakes and streams, reducing quality of water and ability for life to be sustained. Fish kills and algae blooms are a frequent result. They also realized that unplanned growth and inefficient land use adversely affect water quality; that the environmental impacts of land use changes are not considered adequately; and that pollution, runoff and toxic pollutants threaten lakes and streams. There are too many wastewater treatment systems, with little coordination of available processing capacities in bordering municipalities. Industrial and municipal waste discharge levels are too high and not uniformly enforced. Incidents of acidic rain are also increasing.

The Water Quality Action Team's goals include the following:

- Rivers, lakes and streams will be suitable for healthy ecosystems, and will be safe for drinking and recreational uses

- Pollution standards will be tighter and enforced better, while waste discharges will be reduced
- The impact of growth and development will be assessed before new construction begins
- Water quality will be set by region-wide standards and will be the focus of regional monitoring and action when needed
- A regional mass transit system will be developed that includes greenway buffer zones, pedestrian walkways, bike paths, and other forms of waterway protection

Specific areas where the Water Quality Action Team will be making recommendations include point and non-point source pollution sources, color and toxicant impacts, nutrient sources and issues, sedimentation and erosion controls, groundwater issues, and controlling urban stormwater. The team did not address the environmental consequences of interbasin transfers or agricultural runoff.

The Water Quality Action Team is working on recommendations for local governments in the region, including Mecklenburg County, to implement the following steps for change:

1. Improve land use decision-making and enforce pollution regulations. Educate businesses, landowners and the public on impact of runoff, discharge and dumping.
2. Create more buffer zones around key water bodies, with local government enforcement of higher sediment controls. Upgrade stormwater management systems; include on-site "Best Management Practices" to control peak run-off volumes.
3. Reduce number of wastewater treatment centers; centralize into larger shared systems. Coordinate new growth with infrastructure before development begins.

Land Use Action Team

The Land Use Action Team recognizes that currently there is a lack of coordination across the region for wise land use, growth and planning. Planning and zoning are reactionary, local planning is haphazard and there is a lack of coordinated zoning. Adjacent communities do not plan together adequately. They also determined that conflicting priorities driven by tremendous growth often means that land use is dictated by immediate needs rather than long-term considerations. Land is used without regard to connectivity and sustainability. They also recognized that housing options are mostly limited to low density, single family options and there is a lack of public input into land use decisions.

The goal of the Land Use Action Team is to create recommendations to achieve comprehensive regional planning that considers environmental, economic, transportation, and infrastructure needs together. They realized that land use recognizes and protects ecological systems. They want a future where multi-use zoning, mixed density housing options and increased education and public input are provided in decision-making processes. They are favoring the use of visual preference surveys and design standards and the development of incentives for mixed-use and more clustered, pedestrian friendly communities.

The Land Use Action Team is suggesting steps for change that include:

1. Developing a plan using small working groups drawn from across the region; using multi-county collaborative teams, planning boards and citizens advisory groups.
2. Amending zoning ordinances to balance incentives and requirements to encourage mixed-density housing and open space protection
3. Establishing a clearinghouse entity that coordinates neighboring jurisdictions and can mediate among competing needs; working to establish a regional land use plan endorsed by local jurisdictions and states.
4. Educating the public on land use issues, using "status quo" vs. "smart growth" scenarios, as well as techniques like visual preference surveys and community meetings.

Open Space Protection Action Team

The Open Space Protection Action Team recognizes that open space and farmland are disappearing at an unacceptable and accelerating rate. There is no inventory or plan in place to protect what remains and there is little political will or incentive to do so. There is also an apparent limited awareness and understanding of the economic, social and environmental value of open space among the communities.

The Open Space Team's vision for the future is one where preservation of an interconnected open space system can occur including forests, parks, prime farmland, unique/environmentally sensitive areas, walking and bike trails and buffer zones along waterways. It is also where open space acreage protected is based on population. They also envision a cooperative regional approach to land use planning, with an emphasis on preserving open space, including economic incentives, zoning, public funding, and tax incentives, etc. The team supports the idea of an education and awareness program for leadership and the public, enabling a shared vision of the value of open spaces.

Recommended steps for change by the Open Space Team include:

1. Develop and implement an awareness/education program and actively market open space preservation. Provide teaching modules on open space benefits for clubs. Include church, town meetings, and schools to engage government leaders, children and adults and farmers about the value of open spaces and preservation options. Include in school curricula and add to college requirements.
2. Establish plan and benchmarks for connected open space acquisition and preservation including environmentally sensitive areas, water way buffers, flood plains, habitat areas, natural areas, natural heritage, fertile farmland and recreation. Redevelop brownfields and abandoned urban areas into urban parks.
3. Enact comprehensive state and local legislation for open space preservation and regional land use planning.
4. Generate or identify funding source and expand support for public and private organizations and trust funds to acquire or reclaim critical open spaces.

5. Create incentives for open space preservation including transfer/purchase of development rights, tax incentives especially for farming and timber, reverse mortgages, zoning, easement laws and such things as incentives for farmers to allow bike trails through their property.
6. The open space strategy groups listed over 50 specific actions, most of which fall into the above categories. Other suggestions included implementation of impact fees, urban redevelopment, and limitations on urban service expansions and tree-cutting ordinances.

After a year of meeting two or three times per month, the Action Teams produced final recommendations for local governments in the region in January 2000 (Appendix D). Once the Voices & Choices Steering Committee has signed off on them, these reports will be presented to decision-makers across the region. Subsequent steps include following up and monitoring progress of initiatives with local governments between the Summer and Fall of 2000. A follow-up Summit is planned for November 2000 to compare real change with the vision of the process.

Voices and Choices Commitment

Mecklenburg County has been very committed to the Voices and Choices process from its inception, through the various ongoing Action Team efforts. As shown on the Charlotte-Mecklenburg Government Involvement table (provided by MCDEP) in Appendix D, Mecklenburg County, the City of Charlotte, CMUD, and the local Centralina COG have invested substantial man-hours to the process and are actively involved with all the Action Teams. Table 9 presents a summary of resources the County and City of Charlotte have contributed to the Voices and Choices areas of concern.

TABLE 9
Summary of Staff Resources Committed to the Voices and Choices Process

Committee/ Action Team	# County Staff Committed	Total # Hours / Month
Steering Committee	1	6.0
Water Quality	7	46.5
Air Quality	5	29.0
Land Use	6	25.0
Open Space	5	21.0
Resource Recovery	6	38.0
TOTALS	30	165.5

6.2.1.2 Surface Water Improvement Management Program

On October 15, 1996, the Mecklenburg County Board of County Commissioners took a stand in support of clean, useable creeks in Mecklenburg County through the adoption of a "Creek Use Policy" calling for all Mecklenburg County surface waters to be suitable for prolonged human contact and supportive of aquatic life. This effort in Mecklenburg County is being referred to as Surface Water Improvement and Management, or SWIM. The SWIM Program is a monumental effort to create a proactive, workable strategy to protect and remediate the

quality of surface waters in the Charlotte-Mecklenburg region. With the SWIM program, Mecklenburg County has recognized the significant impacts urban growth and development have historically had on local water quality and stream health in the region. The SWIM Program and related Stream Buffer requirements (see complete copies in Appendix D) being implemented by Mecklenburg County are intended to mitigate the potentially significant water quality impacts of future urbanization and buildout of the County by the year 2030, with specific programs that preserve wetlands, create stream buffers, and protect water quality and aquatic habitat. This section of the report was developed from communications with Mr. Rusty Rozzelle of Mecklenburg County, and from information contained in the Consensus Stream Buffer Plan (MCDEP, 1998B).

A panel of stakeholders including representatives from development and environmental interest groups (SWIM Citizen Advisory Panel) has been working diligently with City and County staff toward the fulfillment of the Board's policy statement since February 1997. With guidance from a private consultant, this panel met numerous times during 1997 with the goal of developing methods to fulfill the Board's policy statement. In April 1998, the Panel reached consensus on a nine-part stream restoration plan called the SWIM Phase I Strategy. This Phase I Strategy was approved by the Mecklenburg County Board of Commissioners and funded beginning in fiscal year (FY) 1998-1999. The annual cost for Mecklenburg County to implement the SWIM Phase I Strategy is \$400,000.

Benefits of the SWIM Phase I Strategy are evident in its nine individual parts, which are as follows:

Part 1 - Enhance Enforcement Of Erosion & Sedimentation Control Ordinances

Responsible agencies include Mecklenburg County Engineering and Building Standards and City of Charlotte Engineering and Property Management. Part 1 is intended to improve the consistency in enforcement of erosion and sedimentation control ordinances through the following activities:

- Increase inspection/ enforcement activities for both the City and County
- Monitor water quality to identify problem basins for more intensive inspection/enforcement and to determine the effects of more consistent enforcement of the ordinances
- Bring a water quality focus to this enforcement through the coordination and consolidation discussed in Part 7 below
- Create a soil erosion and sediment control certification process that would require companies or individuals involved in land-disturbing activity, such as designers, grading contractors, general contractors, owners, and project managers, to become trained and certified
- Determine appropriate actions for repeat erosion control violations

This part of the SWIM Strategy was completed as of June 30, 1999. A proactive erosion control plan was developed and implemented which focuses on increased inspections and prevention of erosion problems. An inspection program was implemented in August 1999 which focused on erosion control from single family construction. Over 2,000 inspections were performed in August alone, and 12,406 inspections were performed through

September 30, 2000 with 703 NOVs issued. A certification program for land disturbers is under development. As previously mentioned, the County's erosion control program earned an award in early 2000 from the NC Sedimentation Control Commission.

Part 2 - Enhance Enforcement of Current Buffers Required in Regulated Water Supply Watersheds

The responsible agency is MCDEP. Part 2 is intended to improve the consistency in enforcement of buffer requirements within the regulated water supply watersheds. Another part of this component is the need to increase inspection/enforcement activities for both the City and County. This part of the SWIM program was completed as of June 30, 1999. Proactive efforts to enhance protection of water supply watersheds have been developed and implemented. All jurisdictions within watershed protection areas have been involved in the coordination of these efforts. A citizen's handbook explaining watershed protection techniques has been developed and distributed along with a mass mailing to all occupants in watershed protection areas (over 25,000).

Part 3 - Establish And Maintain Vegetative Stream Buffers ("SWIM Stream Buffer Plan")

The responsible group is SWIM Staff and Panel. Enforcement oversight is provided by an eleven member Surface Water Improvement and Management Review (SWIMR) Commission. Part 3 was intended to plan where and how to effectively use vegetative buffers along streams beginning with (but not limited to) perennial streams to protect water quality. Benefits of the SWIM stream buffers will include the filtering of pollutants, storage of floodwater and provision of much needed green space to the community. This task was coordinated with Storm Water Services and its work on floodplain management; Park and Recreation and its work on the Greenway Master Plan, which will support expansion of the greenway system; and City Engineering and its work on the Bikeway study.

A Consensus Stream Buffer Plan was approved for implementation by both the County and City of Charlotte in April 1999. Mecklenburg County has developed the necessary County Subdivision, Zoning and Floodway ordinance revisions to implement the SWIM Buffer Plan. These ordinances were approved by the County Board of Commissioners and the Charlotte City Council in November 1999. Each of the Towns within the County have also adopted ordinances to implement the SWIM stream buffers. A copy of the ordinances is found in Appendix D.

Details of the SWIM Stream Buffer Plan. The purpose of the proposed stream buffer network in Mecklenburg County is to ensure that the stream and adjacent lands will fulfill their natural functions. Stream systems are comprised of the stream and their drainage basins. Streams have the primary natural functions of conveying storm and ground water, storing floodwater and supporting aquatic and other wildlife. Vegetated lands adjacent to the stream channel in the drainage basin serve as a "buffer" to protect the stream system's ability to fulfill its natural functions. Primary natural functions of the buffer include:

- Protect water quality by filtering pollutants
- Provide storage for floodwaters
- Allow channels to meander naturally
- Provide suitable habitats for wildlife

Managed uses of the stream system are permitted but should be located outside of the Stream Side Zone where practical. Under certain circumstances, sanitary and storm sewers will need to be located within the buffer and sometimes within the Stream Side Zones. These circumstances should be minimized whenever practical and will require specific restoration as specified below under "Mitigation." CMUD will determine the appropriate location for all sanitary sewer facilities. Buffer disturbances for managed uses should be coordinated to ensure minimal disturbance of the buffer system. For example, if it is necessary to install utilities in the Stream Side Zone, then any greenway trails built should follow these cleared areas instead of causing additional clearing. Examples of managed uses include:

- Construction of greenway trails
- Installation of utilities
- Installation of stormwater BMPs
- Near perpendicular crossings by roads, driveways and utilities

Unavoidable or requested buffer impacts (including filling, piping of waterways, clear-cutting of streambanks and relocations of creeks) would require specific mitigation that could include:

- Installation of structural stormwater BMPs
- Off-site stream restoration
- Off-site stream preservation
- Off-site wetlands preservation
- Off-site preservation of bottomland hardwoods
- Controlled impervious cover development
- Open space / clustered developments
- Purchase of mitigation credits

The approved Consensus SWIM Stream Buffer Plan can be found in Appendix D. It requires protection of a three-zone urban stream buffer system throughout the County, with increased land use restrictions closer to the stream bank. The plan requires protection of natural vegetative and forested buffers around all perennial streams with drainage basins greater than 100 acres. [Mint Hill, Cornelius and Huntersville begin the buffer requirement with drainage areas greater than 50 acres] The number of miles of County streams that would meet the SWIM buffer requirements (and therefore would require buffers to be protected along their lengths) is 862 miles or approximately 70 % of all streams in the county. The Stream Buffer provision of the SWIM program will specifically protect approximately 250 stream miles or approximately 70% of all streams in the receiving basin portion of Mecklenburg County.

In addition to the SWIM initiative, the Mecklenburg County Stormwater Advisory Committee (SWAC) is pursuing additional protection of all perennial streams through an administrative change to the Charlotte-Mecklenburg County Storm Water Design Manual. SWAC's initiative is intended to provide mechanisms for streambank stabilization and streambank erosion control. The administrative change of the manual is expected to include provisions for which riparian buffers would be an integral part of a number of options for streambank stabilization. This initiative may potentially increase the number of buffered stream miles in the county.

According to the SWIM Stream Buffer Plan, total buffer widths requiring protection vary from 35 to 100+ feet, with wider buffers further downstream and increased use restrictions closer to the stream bank. Grandfathering is clearly specified for certain properties.

Mecklenburg County has provided incentives for developers to comply with the buffer requirements, including :

- Purchasing or accepting conservation easements and fee simple buffer lands
- Relaxing development standards to accommodate preservation of the buffers
- Providing density bonuses for developments that designate buffers beyond the minimum requirements

Although the SWIM buffer requirements for Mecklenburg County do not specifically list protection of wetlands as a goal of the program, the SWIM rules may effectively protect a significant amount of bottomland hardwood wetlands and forests exist in the receiving basin along protected streams, creeks and rivers. The SWIM program and buffer protection requirements may partially mitigate the impacts on forest resources in the basin.

Part 4 - Address Elevated Levels of Fecal Coliform Bacteria

The responsible agency is MCDEP. SWIM staff worked closely with CMUD and other agencies to complete this element by June 30, 1999. This element identified sources of elevated levels of fecal coliform in surface waters in the county and incorporated that information in the water quality modeling work and management strategies designed to eliminate sources of fecal coliform.

MCDEP is currently working on developing and implementing a strategy for enhancing efforts to identify and eliminate sources of fecal coliform bacteria through concentrated water quality monitoring and follow-up efforts in identified problem areas. Beginning in late 1999, MCDEP initiated efforts to develop a total maximum daily load (TMDL) for fecal coliform for the Little Sugar Creek and McAlpine Creek watersheds. This effort was initiated in cooperation with NC DWQ, South Carolina Department of Health and Environmental Control, CMUD, City and County Stormwater Services, and a group of other Stakeholders. A detailed water quality model was developed for this effort and several studies were initiated to determine significant sources of fecal coliform. Leaks from CMUD sewer lines, storm sewers, failing septic systems, water fowl and other animals (including agricultural operations) were all identified as major contributors of elevated fecal coliform levels in the streams. A report documenting the TMDL studies and development is planned for the first quarter of 2001 (Rozzelle, 2001).

MCDEP's proposed method for dealing with the leaking sewer lines from CMUD include:

- Investigating CMUD's reports of leaks to ensure that the leaks are corrected
- Monitoring and mapping sewer leaks and fecal coliform monitoring data to show correlations and trends
- Recommending priority rehabilitation areas to CMUD
- Working with CMUD to initiate corrective actions

According to SWIM Activity's Report provided by MCDEP (dated June 30, 1999), Briar Creek and Little Sugar Creek have shown a reduction in fecal coliform levels due to this component of the SWIM program.

Part 5 - Implement Countywide Water Quality Modeling

The responsible agency is MCDEP. Although this component is ongoing, substantial progress has been made. MCDEP has capability for county-wide modeling using a simple GIS based program developed for Charlotte Storm Water Services. The County has also developed a dynamic water quality model for the McDowell Creek watershed as a pilot study. The modeling results will be used to develop a watershed management plan for the watershed. This plan will be developed in cooperation with the Town of Huntersville, the municipality with local planning jurisdiction in the watershed. This same dynamic model (Hydrologic Simulation Program Fortran -HSPF) is being used for the fecal coliform TMDL development discussed above. Additional modeling is planned on a watershed basis to address needs for BMPs and to assist with land use planning efforts.

Part 6 - Enhance Water Quality Monitoring

The responsible agency is MCDEP. This task was completed as of June 30, 1999 and required a total of 385 hours of MCDEP staff time. The completed water quality monitoring program has been modified to support the water quality modeling initiative and also to significantly improve MCDEP's capabilities of identifying and eliminating sources of pollution.

MCDEP performs comprehensive stream monitoring on a regular basis to identify short-term water quality problems and eliminate pollution sources in the County, and to identify long-term trends in water quality conditions and initiate efforts aimed at maintaining and restoring water quality in Mecklenburg County. They are currently focusing their efforts on:

- Monitoring 48 stream sites monthly, quarterly or annually for the following parameters: alkalinity, total phosphorus, BOD₅, TKN, NH₃-N, NO_x, total solids, turbidity, fecal coliform, pH, dissolved oxygen, temperature, conductivity, VOCs, and toxic and mineral metals.
- Monitoring 18 sites on Lake Norman, Mountain Island Lake and Lake Wylie monthly for alkalinity, total phosphorus, orthophosphorus, TKN, NH₃-N, NO_x, total solids, turbidity, chlorophyll *a*, fecal coliform, pH, dissolved oxygen, temperature, conductivity, and secchi disk depth.
- Sampling 37 sites on Lake Norman, Mountain Island Lake and Lake Wylie monthly for fecal coliform bacteria between May and September.
- Sampling 65 stream sites for benthic macroinvertebrates on an annual or 3-year cycle.
- Performing a fish community analysis on a 5 year rotation at the 65 benthic sites with fish tissue analyses.
- Entering chemical and physical data into a Water Quality Index (WQI) monthly and generating a numerical value which indicates general water quality conditions at each monitoring site. The monitoring sites are grouped by basins and the monthly

WQIs for each of the sites are averaged together to obtain an average WQI for the basin. A biological index of water quality is established using the benthic data. The WQIs are averaged with the current biological index rating for the basin calculated on the same scale as the WQI. The average of the WQIs and the biological index produces the Water Quality Rating for each basin. A color coded map is used to display this rating by basin for the entire county.

Recent evaluation of the County's monitoring program have proven that current monitoring efforts are ineffective at identifying the short-term water quality trends which are used to identify and eliminate pollution sources and restore water quality. The frequency of sampling needs to be increased for select problem parameters at specific sites in order to fulfill the short-term goals of the monitoring program. However, less frequent sampling is needed to fulfill the long-term trend goals of the program. A review of past data reveals that quarterly monitoring may be adequate to achieve these long-term goals.

MCDEP's proposed enhancements to its current Water Quality Monitoring efforts include:

- Sampling 48 stream monitoring sites quarterly instead of monthly. The parameters currently monitored will continue to be used. Sampling locations will remain the same. Additional analyses will be performed for toxic and mineral metals quarterly. VOCs will continue to be analyzed annually.
- Sampling 18 lake monitoring sites quarterly, except between May and September when sampling will be performed monthly. The 37 bacteriological monitoring sites will also be sampled monthly between May and September. The parameters currently monitored will continue to be used. Sampling locations will remain the same.
- Flow measurements will be collected at all 48 stream monitoring sites at the time of sampling.
- Group Leaders will identify sites for short-term trend analysis for the specific purpose of identifying and eliminating sources of pollution. Every attempt will be made to use field data collection in the identification of these pollution problems. When sampling is required, analyses will be performed for a limited number of parameters which have a quick lab turn-around to eliminate problems associated with waiting for lab results. Intense sampling efforts will be conducted in specific areas over a short period of time. When the pollution problems are corrected, new areas will be targeted.
- The current use of the Water Quality Rating system will continue. Efforts will be initiated to publish Water Quality Rating maps in the newspaper and other publications as a public education tool.
- The data from lake and stream monitoring will be used in conjunction with water quality models under development.
- The environmental consulting firm CH2M HILL has been retained by Mecklenburg County to assist MCDEP in developing procedures to review statistical relationships between monitoring parameters in historical data and to develop a more comprehensive Aquatic Integrity Index that would include stream habitat and benthic information.

Part 7 - Improve Coordination

The responsible group is MCDEP. Goals of this part included improving coordination and cooperation between the Engineering, Environmental Protection, Storm Water Services, Park and Recreation, CMUD and Planning Commission departments to address water quality issues. For example, Engineering, Park and Recreation, Environmental Protection and Storm Water Services departments have begun a number of overlapping initiatives involving the streams and creeks. The SWIM staff is considering the consolidation of all work regarding streams and creeks under a single advisory committee and reviewing the stated purpose and organization of the Storm Water Advisory Committee, Environmental Protection Commission and Greenway/Trails Advisory Council. Currently the Creek Advisory Committee meets monthly to coordinate "Creek Activities" between County and City agencies.

Part 8 - Conduct Stream Inventory and Assessment

The responsible agency is MCDEP. Part 8 involves the completion of an inventory and assessment of Mecklenburg County's stream systems to map aquatic habitats and identify the potential location for community scale BMPs (as opposed to BMPs that are small scale and specific to individual properties). This task will lead to the identification of environmentally sensitive areas that need protection. This component of the SWIM Program has required 256 hours of MCDEP staff time and was still in progress as of June 30, 1999. A stream inventory protocol and an assessment strategy has been developed and is being performed as part of biological monitoring efforts at the 65 sites discussed above. The Mecklenburg Habitat Assessment Protocol (MHAP) was used at all of the MCDEP monitoring sites in 2000 and a draft final report for the project is under review. The environmental consulting firm CH2M HILL is assisting MCDEP with this effort.

Part 9 - Increase Public Education and Awareness

The responsible agency was MCDEP. This task was completed in June 1999 with a total of 521 hours of MCDEP staff time dedicated to increasing public awareness concerning water quality issues. A new staff position was funded at the beginning of 1999 to do public education. Radio, television, newspaper and local magazine ads were used to increase public awareness and involvement toward improving water quality conditions. A similar effort is planned for next year. This task is designed to determine the public's current awareness of water quality issues at the beginning of the program and, on each of the three anniversaries following the commencement of the program, the public's awareness will be measured to gauge the effectiveness of the program and the specific methods that were used to increase awareness.

6.2.1.3 Goals of MCDEP

The goal of MCDEP for FY 1999-2000 is "Clean Water." To achieve this goal, the Water Quality Program within MCDEP will focus its efforts on the following key areas:

1. Successfully fulfill all nine parts of SWIM Phase I.
2. Complete the Water Improvements Now (WIN) Initiative for the McDowell Creek Basin as a pilot for possible implementation county-wide in future years as part of SWIM Phase II.

3. Develop an active constituency within the community for improving water quality through the efforts of SWIM and the expansion of the Adopt-a-Stream and Storm Drain Stenciling programs as well as the possible development of a volunteer monitoring effort.
4. Identify areas of poor water quality through the implementation of enhanced water quality monitoring efforts and special short-term monitoring initiatives to identify and eliminate sources of pollution and produce measurably improved water quality.
5. Increase enforcement of sediment and erosion control ordinances and reduce sediment loading in surface waters through the implementation of an inspection program for single family construction sites in cooperation with the Mecklenburg County Land Development Program.
6. Identify problem stormwater pollutants and their sources and develop an Action Plan for reducing these pollutants in Mecklenburg County surface waters through the use of BMPs.
7. Incorporate water quality modeling into stream assessment efforts.

MCDEP's commitment to achieve its goal is summarized in Tables 10, 11, 12 and 13. Table 10 contains key elements for the City of Charlotte Stormwater Program carried out by MCDEP in fiscal year 1999-2000. These program elements are based on the City's NPDES stormwater permit and represent approximately 95 percent of the City of Charlotte Stormwater Program. A description of the City of Charlotte Stormwater Program for 2000 can be found in Appendix D. Table 11 summarizes voluntary pre-Phase 2 stormwater program activities for Mecklenburg County conducted by MCDEP. Table 12 summarizes additional elements performed by MCDEP beyond the NPDES stormwater permit requirements, and Table 13 summarizes MCDEP's SWIM Phase 1 program elements.

TABLE 10
Key Elements for the City of Charlotte Stormwater Program

Program Element	Program Description
CR-M(7)	Complete standardization of inlet cleaning procedures/ Train maintenance crews
CR-M(8)	Remove litter from streams (Big Sweep-Fall, Inmate Labor-Year Round, Hands on Charlotte-Spring)
CR-MP(1)	Complete a feasibility analysis for BMPs in new development/Modify ordinances to include water quality requirements for new development
CR-MP(4)	Enhance BMP design criteria/Perform BMP inspection & monitoring
CR-MP(6)	Coordinate water quality issues between different agencies
CR-MP(7)	Conduct BMP pilot studies
CR-CF(3)	Conduct biological monitoring/Coordinate flood control and channel improvement with water quality
CR-FC(4)	Coordinate greenway construction with water quality enhancements

Program Element	Program Description
CR-FP(1)	Educate citizens/businesses concerning the proper handling of pesticides & fertilizers to prevent water quality problems
CR-FP(2)	Promote Integrated Pest Management (IPM)
CR-FP(4)	Ensure proper pesticide/ fertilizer application by City & County
CR-FP(5)	Conduct water quality monitoring for pesticides annually through ISM
IC-O(1)	Distribute information to problem businesses/industries to improve compliance
IC-S(3)	Conduct field screening activities including ambient, short term and storm water monitoring
IC-S(3)	Enhance water quality assessment technology to identify & reduce storm water pollution problems
IC-S(3)	Ensure that water quality data is available to public
IC-S(4)	Enhance Adopt-A-Stream & Storm Drain Stenciling Efforts
IC-S(5)	Maintain GIS database & produce reports for identifying chronic polluters
IC-F(3)	Conduct follow-up investigations to identify and eliminate water quality problems
IC-R(1)	Coordinate emergency response activities
IC-U(1)	Implement used oil inspection program
IC-I(1)	Reduce discharges of sewage
IN-I(1)	Coordinate inspection activities between agencies /CATIE
IN-I(3)	Train inspectors
IN-I(4)	Conduct industrial inspections
IN-I(5)	Educate/inform industrial facilities to improve compliance
IN-M(1)	Monitor industrial facilities
IN-M(2)	Maintain database of industrial inspection & monitoring results/Identify chronic polluters
CS-I(3)	Train site inspectors/Develop & implement action plan for proactive erosion control/Use water quality data to target problem areas/ Implement licensing program
ED-P	Coordinate with the City in the development & implementation of the "Education Plan"

TABLE 11
County Stormwater Program Elements

Program Element	Description
CS-I(3)	Train county inspectors concerning water quality concerns
CR-M(5)	Monitor the short- and long-term water quality impacts of working in the stream channel
CR-MP(4)	Quantify the pollutant removal rates of select BMPs for specific parameters
CR-FC(3)	Assist in the development of ecologically sensitive channel project designs (bioengineering) and monitor a select number to quantify water quality benefits

TABLE 12
County Surface Water Program Elements

Program Element	Description
Monitoring	Conduct ambient monitoring activities for lakes and streams
MOA	Execute a Memorandum of Agreement with the State
WWTP Inspections	Conduct at least one inspection at all minor NPDES WWTPs
Watershed Management	Protect the water quality in the drinking water supply watersheds
Respond to Service Requests	Respond to all service requests within 3 working days of receipt
Respond to Emergencies	Respond to all spills/emergencies within 2 hours of receipt

TABLE 13
SWIM Phase I Elements

Program Element	Description
Part 1	Enhance enforcement of erosion and sediment control ordinances
Part 2	Enhance enforcement of current buffers required in the regulated water supply watersheds
Part 3	Establish and maintain vegetated stream buffers
Part 4	Address elevated levels of fecal coliform bacteria
Part 5	Implement county-wide water quality model
Part 6	Enhance water quality monitoring
Part 7	Improve coordination between agencies
Part 8	Conduct stream inventory and assessment
Part 9	Increase public involvement
WQ Improvements	Document improvements in water quality as a result of SWIM
Presentation of Results	Publish SWIM progress reports
BMP	Develop and implement the WIN Initiative in the McDowell Creek Basin
Trust Fund	Effectively fulfill the requirements of the N.C. Clean Water Management Trust Fund Grant

6.2.1.4 Commercial pre- and post-development hydrograph

The zoning ordinance (Chapter 12, Part 6) for both Mecklenburg County and the City of Charlotte include regulations regarding stormwater drainage. A drainage plan must be submitted and approved prior to development or use of land that would create more than 20,000 square feet of impervious ground cover, except for land developed or used for agricultural uses. The City of Charlotte directly states that the drainage plan will not be approved “if the impervious ground cover would increase the peak level of stormwater runoff, unless the drainage plan identifies measures to control and limit runoff to peak levels no greater than would occur from the site if left in its natural, undeveloped condition.”

Neither the City nor the County Engineer will approve the drainage plan unless it complies with the standards contained in the Charlotte-Mecklenburg Land Development Standards Manual and the Charlotte Mecklenburg Storm Water Design Manual. So, by reference to the Storm Water Design Manual, both the City and the County require “control structure release rates to approximate pre-developed peak runoff rates for the two- and ten-year storms, with emergency overflow capable of handling the 50-year discharge”.

The City Engineering and Property Management Land Development Division and the County Engineering and Building Standards Land Development Services act as the City and County Engineer, respectively. The drainage plans are reviewed and ultimately approved prior to a building permit being issued. Inspections are conducted throughout the construction phase, including a final inspection, which should show compliance with the approved plan. Developers usually utilize bonds in order to occupy portions of the development prior to completion. If the development does not pass the final inspection, the bonds are held and no certificate of occupancy is issued.

The two most common means of complying with the release rates are detention ponds and underground storage (either by increased pipe sizes or storage tanks). According to the Storm Water Design Manual, the “storage volume shall be adequate to attenuate the post-development peak discharge rates to pre-development discharge rates for the two- and ten-year storms.”

Residential development is regulated under subdivision ordinances, and the City and County are also considering ordinances to control stormwater flow for residential development. They have started this effort, and it includes the participation of a stakeholder group composed of City and County staff, neighborhood associations, environmental groups, and developers. This group is examining a wide range of options outlined in their workplan and are working to address the following issues:

- Detention requirements for single family subdivisions
- Detention options for commercial and multi-family developments
- Simplified detention calculation method for small sites
- Detention policy based on location in watershed
- Change to impervious surface area threshold for commercial and multi-family development detention requirements
- Benefits and impacts of designing storm water detention basins and spillways for 100-year storm event

- Water quality management/volume control
- Options for detention/retention design and implementation for improved channel stabilization downstream of basins

It is anticipated that ordinances related to this issue will be adopted by 2002. Information on the mission, tasks and schedule of the stakeholder group is found in Appendix D.

6.2.1.5 Parks and Open Space Program

Mecklenburg County adopted a Parks Master Plan in 1989 and a Greenway Master Plan in 1980 to balance land use patterns and enhance liveability throughout the county. (Mecklenburg, 1990A). The Parks Master Plan proposed four main classifications of parks throughout the county to be pursued:

- Nature Preserves
- Community Parks
- District Parks
- Neighborhood Parks

As discussed in Section 3.2.2., several community parks, district parks and neighborhood parks are planned by Mecklenburg County in the receiving basin. These types of parks typically include disturbance and development of the areas to create active recreational settings for ball fields, golf courses, etc. Only one nature preserve (preserved land with limited disturbance for parking facilities only and trails) exists in the receiving basin, the Reedy Creek Nature Preserve and Park (700-acre existing nature preserve, trail and park proposed for a 300-acre expansion in the Northeast District). No other nature preserves are planned in the receiving basin (Mecklenburg, 1990A).

The Greenway Master Plan identifies stream corridors which are being considered for inclusion in the greenway system. The implementation of the Greenway Master Plan will create numerous opportunities for multi-objective projects which will serve to: mitigate future flood losses by removing existing structures from the floodplain; protect existing open space from future development; protect fish and wildlife resources; and protect water quality by protecting riparian buffers.

6.2.1.6 Adopt-a-Stream Program

MCDEP has developed an Adopt-a-Stream Program for the purpose of locating and eliminating sources of pollution in the streams of Charlotte and Mecklenburg County. The sources of pollution in urban streams are often hard to detect through standard monthly monitoring. MCDEP's Water Quality Program has found that one of the best ways to find these problems is to physically get into the stream channel and walk the stream in search of pollution sources.

The Adopt-a-Stream Program allows groups to "adopt" stream segments with a minimum one-mile length. The groups walk their stream segment twice a year, once in the spring and once in the fall, to identify water quality problems. The groups also conduct one stream clean-up per year along their assigned stream segment. This involves the physical removal of trash and debris from the stream channel to a designated location for collection and proper disposal. A sign is placed at a bridge along each adopted stream segment identifying

the adoption group. Detailed records will be kept by each group while performing all Adopt-a-Stream activities. These records are turned into MCDEP within 72 hours of completing stream walking activities. MCDEP will follow up on all identified pollution problems to ensure that they are eliminated and water quality is restored.

All volunteers are trained by MCDEP before they partake in Adopt-a-Stream activities. This training illustrates normal stream characteristics, common stream problems, proper stream walking techniques, and necessary safety measures.

6.2.1.7 Water Reclamation

In an effort to minimize discharges to surface waters, decrease use of potable water (thereby reducing the need for transferring water across basin boundaries), reduce peak demand for potable water, and use treated wastewater as a valuable resource, CMUD has been aggressively pursuing opportunities for water reuse. At their Mallard Creek water reclamation facility, CMUD is permitted to reuse up to 3 mgd of reclaimed water (treated wastewater) for irrigation purposes. This was the first facility permitted for conjunctive use (i.e., both discharge and reuse) of reclaimed water under the revised rules for water reclamation developed by the DWQ in 1996. CMUD is continuing to promote opportunities for reuse in the IBT project area by proposing to construct the Three-County Water Reclamation Facility with a substantial portion of the effluent reused rather than discharged into the Rocky River.

6.2.1.8 Water Conservation / Drought Management

In 1986, the Charlotte City Council granted authority for the City Manager to invoke mandatory water conservation, and CMUD developed a Water Shortage-Drought-Emergency Response Plan. The plan consists of voluntary and mandatory procedures, which are instituted when pumping and treatment demands exceed 120 mgd for five (voluntary procedures) or ten (mandatory procedures) consecutive days with no weather breaks predicted. According to DWR, voluntary and mandatory measures can be expected to reduce water use by 5 to 15 percent and 15 to 30 percent, respectively.

The voluntary conservation procedure requests that non-essential watering be conducted by residents only on an odd or even day of the week, which corresponds to the house number. A six-step process is implemented to notify Mecklenburg County citizens of the voluntary conservation procedure that should be followed, and a brochure with additional water conservation tips is to be distributed. The Water Distribution Division will also begin working water system priority leaks within 48 hours and emergency leaks immediately.

When CMUD recognizes that conditions requiring mandatory conservation procedures exist, a Notice of Declared Water Distribution Crisis must be posted by the City Manager 12 hours in advance of the mandatory measures taking effect. The mandatory conservation procedures include a system-wide ban on non-essential irrigation (excluding that essential to businesses, golf courses, greenhouses, etc.). The same notification procedure applies; however, violations will be issued for non-compliance. The first violation within 24 hours will result in a warning, and the second violation will result in a penalty.

The County is currently taking the following measures to reduce water consumption rates:

- Although there are currently no mandatory codes specifying water conservation devices, there are conservation rates in effect which dictate that high water use results in higher cost as opposed to giving preference to high quantity residential and commercial users.
- Although there is currently no plan in effect to establish conservation efforts, a plan is being drafted, called the Water Conservation Plan, and is due out in the spring.
- A major element of the plan will be wastewater reclamation. A project is currently underway to reclaim water at Mallard Creek WWTP.
- Other potential elements of the plan to be included at the discretion of the director of CMUD include:
 - Use of water conservation devices in new buildings
 - Limits on irrigation (number of days per week)
 - Conservation rates may get more aggressive.

The strategy behind the County's plan is to focus on incentives and education more than on ordinances.

6.2.2 North Mecklenburg Towns

The Town of Cornelius is located between the Towns of Davidson to the north and Huntersville to the south, with Lake Norman to the west and the Mecklenburg / Iredell County line to the north, in the northeast section of Mecklenburg County. These communities have jurisdictions that adjoin one another, and extend along the ridge line between the Catawba and Yadkin-Pee Dee River Basins, with portions of their jurisdictions split north to south by either I-77 or NC 115 highways that follow near the line that separates the source and receiving basins for the project. Additional water from the proposed IBT is planned to be delivered to all three of these communities by CMUD. The provision of water from the IBT may facilitate growth in these communities, just as it may do for unincorporated areas of Mecklenburg County. A summary of each town's current land use planning regulations and environmental protection programs is provided below.

6.2.2.1 Town of Cornelius

The general principles for growth as discussed in the Land Development Code for Cornelius are patterned after the New Urbanism and Sustainable Development movements to combat sprawl, protect downtown business districts, preserve the architectural integrity of buildings, reduce traffic congestion, allow for a variety of housing types and prices, and protect environmental resources. Specific provisions in the town's ordinances that are in addition to programs already required by state or county regulations and that are unique in their protection of environmental resources include:

1. Sedimentation and erosion from land disturbance activities of less than one acre are required to be controlled using silt fences or other measures approved by the Planning Director to prevent siltation of surface waters.

2. Although not required to by state or federal regulations, Cornelius requires the construction of stormwater control structures for any site of disturbed area over 1 acre in size and located in a non-residential development or mixed use development that exceeds 50% impervious coverage. Exceptions include areas already in a Water Supply Watershed, or properties located adjacent to perennial streams where a determination has been made that runoff from the site will not affect downstream properties.
3. Significant stands of trees, stream beds, and other valuable topographic features shall be preserved “where practical.”
4. Greenways and greenbelts will be protected according to open space dedication requirements of the plan.
5. Tree and landscaping survey will be performed prior to approval of development plans so that existing vegetation may be preserved and unique topographical conditions are considered.
6. Avoidance of stream channel and wetlands modifications and maintenance of undisturbed, natural stream buffers of 30 feet along every perennial stream are required.

Items that are missing from the ordinance that could enhance environmental protection in the town:

1. Control of stormwater on sites with the goal of protecting water quality, in addition to preventing flooding
2. Acknowledgement of the presence of SNHAs, sensitive species and habitats in the area and adjustment of long-range land use plans accordingly

6.2.2.2 Town of Huntersville

The general principles for growth as discussed in the Town of Huntersville’s Zoning Ordinance (Huntersville, 1996) and Strategic Community Plan (Huntersville, 1995) are patterned after established patterns of New Urbanism in order to preserve its downtown historic district, to combat sprawl and encourage pedestrian-oriented development. The Zoning Code for Huntersville is performance-based, with strict urban design requirements, so that there is great flexibility in housing and mixed use densities to ensure a variety of housing options and encourage pedestrian-oriented developments. A primary focal point of Huntersville’s ordinance is its establishment of land use patterns to support future rapid transit along existing rail lines through downtown.

Specific provisions in the town’s ordinance that are in addition to programs already required by state or county regulations and that are unique in their protection of environmental resources include:

1. The creation of an edge (or “growth boundary”) between urban and rural land uses to preserve the town’s rural heritage.
2. Open space preservation is promoted with incentives for compact development sited to maintain rural vistas.

3. Huntersville has been a leader among local governments in pursuing additional enabling legislation from the state to prevent sprawl, especially from large lot subdivisions.
4. They have worked closely with surrounding communities and the county to develop an integrated transit/land plan for rapid transit.
5. They have adopted, essentially word for word, Mecklenburg County's SWIM Stream Buffer requirements, with the exception that they require buffers in all areas that drain 50 or more acres (rather than the 100 acre exemption of the County program).
6. Cluster developments allow preservation of on-site environmental resources.

Items that are missing from the ordinance that could enhance environmental protection in the town:

1. Control of stormwater on sites with the goal of protecting water quality, in addition to preventing flooding
2. Acknowledgement of the presence of SNHAs, sensitive species and habitats in the area, and adjustment of long-range land use plans accordingly

6.2.2.3 Town of Davidson

The general principles for growth as discussed in the Town of Davidson's Land Plan, Zoning and Subdivision Ordinances and other local codes, are designed to accommodate growth while maintaining ecologically sound small town character. (The following is a summary of all the sources listed under Davidson, 1995).

Specific provisions in the town's ordinance that are in addition to programs already required by state or county regulations and that are unique in their protection of environmental resources include:

1. The creation of an edge (or "growth boundary") between urban and rural land uses to preserve the town's rural heritage.
2. Open space preservation is promoted with the use of required dedications by residential subdividers, often times consistent with the Parks Master Plan for the town.
3. The Land Plan sets out a sliding scale of density incentives to encourage more compact site planning and to encourage the preservation of open landscapes for environmental protection and community recreation
4. Davidson's Subdivision Ordinance contains the provision whereby an environmental impact statement may be required with preliminary subdivision plats if the development exceeds two acres and the Board deems it is necessary due to the nature of the land to be subdivided.
5. Subdividers are encouraged to protect existing trees on sites, but are not required to.

Items that are missing from the ordinance that could enhance environmental protection in the town:

1. Require protection of trees and existing natural vegetation on sites

2. Require preservation of forested stream buffers from development impacts to protect water quality
3. Require the control of stormwater on sites with the goal of protecting water quality, in addition to preventing flooding
4. Acknowledgement of the presence of SNHAs, sensitive species and habitats in the area, and adjustment of long-range land use plans accordingly

6.2.3 Town of Mint Hill

The Town of Mint Hill is a predominantly low density residential town located at the southern end of the County, 2 miles from the Union County boundary, along the border between the source and receiving basins.

The General Principles for growth, as discussed in the Town of Mint Hill's Land Plan (Mint Hill, 2000) are to: focus new growth on areas contiguous to the current town limits and away from natural resource areas; preserve the small town character/atmosphere; and maintain undeveloped land and open space. The principles for growth are achieved by setting goals and recommendations to meet those goals.

Specific provisions present in the town's ordinances that are in addition to programs already required by state or county regulations and that are unique in their protection of environmental resources include:

1. Policies of the land use plan discourage the development of subdivisions with wells and package treatment systems, due to the potential environmental impacts of these systems in the region.
2. Policies of the Land Plan also promote the protection of the unique rural and country village character of the area.
3. Mint Hill's Zoning Ordinance contains the provision whereby an environmental impact statement is required for major commercial or residential developments greater than 2 acres.
4. Adoption of S.W.I.M. Stream Buffer Ordinance (July 20, 2000) – Same policies as Mecklenburg County, with the exception that the buffer requirements begin at the point where the stream drains 50 acres or greater: the Mecklenburg County buffer policy begins at 100 acres. Also, there is no incentive program; Mecklenburg County offers incentives to offset restrictions that buffer requirements place on development.
5. Charlotte-Mecklenburg Parks Master Plan (1989)
6. Support County Greenway Master Plan (1999-2009)
7. Policies of land use plan recommend concentration of commercial businesses along existing thoroughfares to avoid traffic in subdivisions, which encourages strip commercial development, sprawl and traffic congestion on arterials.
8. Requirements for protection of trees and existing natural vegetation on sites.
9. Requirements for preservation of forested stream buffers from development impacts to protect water quality.

10. Control of stormwater on sites with the goal of protecting water quality, in addition to preventing flooding.

Table 14 provides a comprehensive summary of the regulatory and non-regulatory framework that provides mitigation to the growth effects of the development that is facilitated by the proposed action.

TABLE 14
Summary of Existing Programs from Section 6.2 and the Environmental Resources They Protect

Program or Regulation	Wetlands	Land Use	Fish & Wildlife	Sensitive Species	Water Quality	Air Quality	Ground -water	Noise	Toxics
Sect. 404	X	X	X	X	X				
Sect. 401	X	X	X	X	X				
NFIP	X	X	X	X	X				X
WRP	X		X	X	X				
Archaeological Protection		X							
Farmland Preservation		(X)	(X)						
Stormwater	X		X	X	X				X
Erosion / sed.	X	X	X	X	X				
SSO Regs.	X	X	X	X	X		X		X
CWMTF	(X)	(X)	(X)	(X)	(X)				
Groundwater		X					X		X
Land Conserv. Incentives	(X)	(X)	(X)	(X)	(X)				
Voices & Choices	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)	(X)
SWIM	(X)	(X)	(X)	(X)	(X)				(X)
Sec 319	(X)	(X)	(X)	(X)	(X)				
Greenways	(X)	(X)	(X)	(X)	(X)				
Adopt-a-Stream	(X)		(X)	(X)	(X)				
Haz. Mitig.	X	X	X	X	X				X
Water Reclamation	X		X	X	X		X		X
Drought Management	X	X	X	X	X		X		
Cornelius	X		X	X	X				
Huntersville	X	X	X	X	X				
Davidson		(X)							
Mint Hill					(X)				

Note:
X = Demonstrates clear environmental benefits, (X) = Shows potential for environmental benefits (program not mandatory/ regulation not yet adopted)

6.3 Proposed Mitigation Measures

This section contains two parts:

- A list of factors to be included in the EA or EIS prepared for future water and sewer line projects to ensure that the potential direct environmental effects of these projects are fully evaluated and mitigated
- A list of local government mitigation measures proposed to adequately mitigate or avoid the significant secondary and cumulative impacts from growth facilitated by the proposed IBT project

The following mitigation measures are aimed to enhance existing and proposed environmental protection regulations at the local level. The proposed measures were developed based on the discussion presented in Sections 6.1 and 6.2 to complement the existing environmental protection regulatory framework. The discussion of existing regulatory and non-regulatory mitigation indicates that there are numerous rules and programs that have been or are being adopted to protect the natural resources of the study area from the effects of urbanization. This comprehensive suite of environmental regulations and programs is found to be quite adequate overall in mitigating the secondary impacts of the proposed action. A summary of these regulations and programs and the environmental resources they protect is provided in Table 14. Therefore, only a limited number of measures to complement this mitigation are provided. These measures, in combination with existing and proposed regulations and programs, as identified in Sections 6.1 and 6.2, support an overall EA and FONSI under NCEPA for the project.

6.3.1 Water and Sewer Line EA/EIS Conditions

Subsequent EA and EIS documents for water and sewer conveyance systems in the receiving basin should contain the following elements to adequately address potentially significant primary/direct impacts:

1. Locations, types, extent, and importance of wetlands and SNHAs in the water or sewer line alignment and proposed construction zone and analysis of projected impacts to wetlands from proposed direct construction impacts.
2. If determined to be necessary, completion of a Wetlands Avoidance and Mitigation Plan through the formation of a workgroup composed of local, state, and federal government agencies and the project consultant. This plan should look at local regulatory and non-regulatory actions that could be taken to supplement existing efforts and adequately reduce the level of wetland impacts from the project.
3. Since projected land uses for the County were not available in GIS format at this time, future EA and EIS documents for water and sewer line projects should contain this information coupled with existing land uses or land cover data for each proposed utility line project and its service area. This analysis should include a discussion of how the project complies with local plans and zoning and is consistent with planned land uses for the area. GIS data coverages of projected land use for Mecklenburg County is currently in the process of being digitized.

4. Acreages and types of sensitive aquatic or terrestrial species or their habitats that may be lost or degraded because of construction or operation of the water or sewer line, with analysis of what can be done to avoid or offset these impacts. Alternative alignments and utility designs should be proposed to mitigate significant impacts to sensitive species or habitats. Particular attention should be given to the Crooked Creek watershed, and suspected locations of other sensitive species that could be impacted by construction of the utilities.
5. Specific design and operational guidance that will be used to avoid system failures and toxic spills into surface waters should be provided, with specific attention given to avoiding sewage releases, sewage overflows and leaks during power outages, storm events and accidental breaks in the lines, equipment and pump stations. Specific attention must be given to methods designed for any project activities in proximity to Crooked Creek and other sensitive habitats identified to reduce the probability for spills within those sensitive areas.

6.3.2 Enhancing and Strengthening Local Government Regulations & Programs

As shown in Table 14, the existing programs and regulations in place at the federal, state and local levels mitigate to a great extent the impacts of land use on water quality, wetlands, sensitive aquatic and terrestrial species, and fish and wildlife habitat. In addition, our evaluation shows an exceptionally strong commitment from Mecklenburg County to address many of the significant environmental impacts predicted from urbanization of the project area. DWR is considering to enhance Mecklenburg County's commitment by recommending to the EMC the inclusion of a number of conditions in the IBT Certificate for the implementation of long-term mitigation measures for secondary and cumulative impacts. The following items are being considered by DWR for inclusion in the IBT certificate:

- Requiring the County to evaluate the feasibility of each element of the SWIM program on an annual basis. For those elements that are deemed feasible, the County should continue to seek funding from its Board of County Commissioners to fund the SWIM program to continue implementing the Phases outlined in Section 6.2.1.2.
- Requiring Mecklenburg County and the City of Charlotte to continue the stakeholder process to investigate water quantity control from single-family development and water quality control for all development. To accomplish this end, the stakeholder group should consider evaluating the feasibility of single-family detention and recommending ordinance revisions based on technical, political, long-term maintenance, cost, and benefits related to the proposed ordinance changes.

These proposed conditions in the IBT certificate can potentially address several environmental secondary and cumulative impacts as outlined in Table 15.

TABLE 15
Impact of Proposed IBT Conditions on Environmental Secondary Impacts

Environmental Secondary Impact	SWIM	Control Stormwater Runoff
WQ Impacts	X	X
Wetland Impacts	X	
Impacts to Mussels	X	X
Fragmented Habitat	(X)	
Loss of Open Space	(X)	

X – Will address this impact; (X) – Has potential to address this impact

The County is working to improve water quality and protect open space and sensitive species habitat in their region, as evidenced in Sections 6.1 and 6.2. In addition to the potential IBT certificate conditions, Mecklenburg County has made other commitments to address secondary impacts. These commitments, along with the proposed IBT conditions and the local programs described in Section 6.2 will result in an insignificant impact on the environmental resources in the receiving basin.

1. Mecklenburg County commits to consider incorporation of a number of recommendations from the Voices and Choices initiative in the county’s environmental protection programs, as appropriate.
2. Mecklenburg County commits to pursue its existing county-wide comprehensive watershed management programs and work with Towns on land use planning. This effort may include working with local land trusts and other natural preservation groups along with large landowners to implement voluntary forest and agricultural preservation plans. There are also a number of growth management tools that Mecklenburg County could use to purchase farmland, forestland, and other open space. Location of proposed parks, greenways and nature preserves should be oriented around location of unique forest resources, sensitive species and their habitats. Mecklenburg County will continue to evaluate the possibility of using other measures besides typical BMPs to protect sensitive aquatic species, including land use controls, alternative land use scenarios and land acquisition. Coordination of this effort with the existing Parks Master Plan, Greenway Master Plan and SWIM Buffer Plan is critical. Also, local zoning ordinances could be amended to create zoning districts that prohibit typical suburban sprawl-type subdivisions, and encourage “smart growth.”
3. Mecklenburg County commits to pursue funding for watershed restoration. This effort includes working with the North Carolina Wetlands Restoration Program to identify potential stream restoration sites within Mecklenburg County and using wetland impact fees generated from projects within Mecklenburg County on county stream restoration.

Table 16 provides a summary of the proposed additional mitigation efforts committed by Mecklenburg County in this environmental assessment.

TABLE 16
Mitigation Monitoring Plan

Mitigation Measure	Implementation	Timing of Action	Lead Agency Responsible for Completing Measure	Agency to Monitor and Enforce
Consider adopting a number of Voices and Choices recommendations at the local level, as appropriate	Mecklenburg County's Board of Commissioners holds a session to hear presentations from the County staff who where a part of the Voices and Choices process. Board of Commissioners recommends feasibility analysis for the implementation of a number of recommendations.	Board of Commissioner's session and feasibility analysis recommendation may occur after Voices and Choices meetings in March 2001	Mecklenburg County	NC Division of Water Resources
	Status: Proposed			
Continue to pursue watershed county-wide management approach with added emphasis on land use planning	Mecklenburg County SWIM staff coordinates and improves cooperation among Engineering, MCDEP, Stormwater Services, Parks and Recreation, CMUD and Planning Commission to address water quality issues; and explore the revision of projected land uses with the goal of incorporating "smart growth" concepts and open space preservation programs to protect environmental resources.	Specific "smart growth" and open space concepts are prioritized in discussions of coordination and cooperation efforts of Part 7 of the SWIM Phase 1 Strategy during the first half of 2000.	Mecklenburg County	NC Division of Water Resources
	Status: Ongoing			
Continue to pursue watershed county-wide management approach with added emphasis on stream restoration	Mecklenburg County staff works with North Carolina Wetlands Restoration Program to identify restoration sites in the County and use wetland impact fees generated within Mecklenburg County to restore county streams	Discussions with Wetlands Restoration Program staff continue. Potential restoration sites are in the process of being identified and progress should occur during 2001.	Mecklenburg County	NC Division of Water Resources
	Status: Ongoing			

SECTION 7

Agency Involvement

COMMENTS WERE REQUESTED FROM VARIOUS AGENCIES AS NOTED IN TABLE B-1 IN APPENDIX B. THE CONCERNS THAT WERE SUBMITTED ARE ADDRESSED IN THE EA AS NOTED IN THE TABLE.

SECTION 8

References

American Lung Association, 1996. Health Effects of Outdoor Air Pollution.

Chafin-Rash, Betty; Executive Director of Voices and Choices. Phone Conversation 10/1/99. [(704) 376-9214]

Charlotte's Municipal NPDES Storm Water Permit. 1993.

Charlotte-Mecklenburg Utilities Department (CMUD). 1999. FERC Application for Increase in Withdrawal Rate from Mountain Island Lake. Prepared by CH2MHILL.

Cornelius, Town of. Land Development Code. Adopted Oct. 7, 1996 and last amended June 7, 1999.

Danielson, Leon E. and Patte, David E.M. North Carolina Cooperative Extension Service web site, Publication Number: RE-6, <http://www.bae.ncsu.edu/programs/extension/publicat/wqwm/re6.html>.

Davidson, Town of. 1995. Various Davidson documents: Land Plan; Zoning Ordinance; Subdivision Ordinance; Noise Ordinance; and, Floodway Regulations.

DENR, Environmental Permit Information Center (EPIC). Erosion and Sedimentation Control Plans web site: <http://www.p2pays.org/ref/01/00487.htm>

Federal Emergency Management Agency (FEMA). National Flood Insurance Program, web site: <http://www.fema.gov/nfip/>

Heath, Ralph C., 1980. Basic Elements of Ground-Water Hydrology With Reference to Conditions in North Carolina.

Huntersville, Town of. Zoning Ordinance. Adopted November 19, 1996 and amended June 22, 1999.

Huntersville, Town of. Strategic Update to the Community Plan. Adopted September 5, 1995.

Keferl, Eugene P. and Shelley, Rowland M. 1988. The Final Report on a Status Survey of the Carolina Heelsplitter, *Lasmigona decorata* and the Carolina Elktoe, *Alasmidonta robusta*, prepared for the US Fish and Wildlife Service and NC State Museum of Natural Science.

Mecklenburg County. 1990A. East District Plan.

Mecklenburg County. 1990B. Northwest District Plan.

Mecklenburg County. 1991. Southwest District Plan.

Mecklenburg County. 1992. North District Plan.

Mecklenburg County. 1996. Northeast District Plan.

Mecklenburg County. April 1999. Consensus Stream Buffer Plan.

Mecklenburg County. October 1999. Hazard Mitigation web site:
<http://engbs.co.mecklenburg.nc.us/storm/html/mitplans/plans.htm>

Mecklenburg County Department of Environmental Protection (MCDEP). 1998A. State of the Environment Report.

Mecklenburg County Department of Environmental Protection (MCDEP). 1998B. Mecklenburg County. Consensus Stream Buffer Plan

Miller, Craig; Water Quality Action Team Member and Environmental Specialist with the Mecklenburg Department of Environmental Protection. Phone Conversations on 10/1/99, 10/17/99 and 10/21/99. [(704) 336-5500]

Mint Hill, Town of. 1986. Land Use Plan.

Mint Hill, Town of. 1998A. Subdivision Ordinance.

Mint Hill, Town of. 1998B. Zoning Ordinance.

Mint Hill, Town of. 2000. Future Land Use Plan.

North Carolina Department of Environment, Health and Natural Resources (DEHNR). 1997. Basinwide Assessment Report Support Document: Yadkin River Basin. Raleigh, NC

North Carolina Department of Environment and Natural Resources (DENR). 1998. Basinwide Assessment Report Support Document: Catawba River Basin. Raleigh, NC

North Carolina Department of Environment and Natural Resources (DENR). Clean Water Management Trust Fund, Web site: [http://www.cwmtf.net/North Carolina Division of Water Quality \(DWQ\)](http://www.cwmtf.net/North%20Carolina%20Division%20of%20Water%20Quality%20(DWQ)). 1995. Catawba River Basinwide Water Quality Management Plan. Raleigh, NC

North Carolina Division of Water Quality (DWQ). 1997. Draft Yadkin-Pee Dee River Basinwide Water Quality Management Plan.

North Carolina Division of Water Resources (DWR). 1987. Potential Effects of Proposed Wastewater Discharges to Middle Creek on Flooding, Streambank Erosion, and Fish Habitat. Raleigh, NC.

North Carolina Natural Heritage Program (NHP). February 19, 1999. "Review of Element Occurrence in Proposed Goose Creek Consolidated Sewage System Project, Mecklenburg, Cabarrus, Stanly and Union Counties"

North Carolina Office of State Planning. 1999. County Growth Projections – 2010 – 2020. Web site: <http://www.ospl.state.nc.us/demog/projbdm1.html>

North Carolina State Historic Preservation Office, County Fact Sheets. 1996. Web site: <http://www.hpo.dcr.state.nc.us/facts/facts.htm>

North Carolina Wetlands Restoration Program (WRP), Division of Water Quality. 1998A. "Basinwide Wetlands and Riparian Restoration Plan for the Catawba River Basin"

North Carolina Wetlands Restoration Program (WRP), Division of Water Quality. 1998B. "Basinwide Wetlands and Riparian Restoration Plan for the Yadkin-Pee Dee River Basin"

North Carolina Wildlife Resources Commission (WRC). April 1998. Draft Fisheries Management Direction for the Catawba River Basin.

North Carolina Wildlife Resources Commission (WRC). March 1998. Draft Fisheries Management Plan for the Yadkin-Pee Dee River Basin.

North Carolina Wildlife Resources Commission (WRC). 1999. Draft Application for 319 Grant. Part 1.

Rozzelle, Rusty. Personal correspondence to Jon Mangles dated October 6, 1999. Package included Stream Monitoring Information, Fecal Coliform Monitoring Information, Stevens Creek/Goose Creek 319 Information, and June 30, 1999 SWIM Activity Report.

Rozzelle, Rusty. Personal correspondence to Bill Kreutzberger dated February 1, 2001. Information for Fecal coliform TMDL.

South Carolina Department of Health and Environmental Control (SC DHEC), 1996. Watershed Water Quality Management Strategy: Catawba-Santee Basin. Technical Report No. 002-96. Columbia, SC

Schafale, Michael P. and Alan S. Weakley. 1990. "Classification of the Natural Communities of North Carolina". Third Approximation. North Carolina Natural Heritage Program, Division of Parks and Recreation. DENR.

Toole, Bill; Environmental Attorney involved with Voices and Choices. Phone conversation on 10/1/99. [(704) 377-8373].

U.S. Department of Agriculture (USDA), 1980. Soil Survey of Mecklenburg County, North Carolina. U.S. Government Printing Office. Washington, DC

U.S. Environmental Protection Agency (EPA), 1999A. Air Data Web site: <http://www.epa.gov/airsdatat/>

U.S. Environmental Protection Agency (EPA), 1999B. Wetlands Trends Web site: <http://www.epa.gov/OWOW/wetlands//vital/status.html>

U.S. Fish and Wildlife Service (USFWS), 1992. "Digest of Federal Resource Laws of Interest to the U.S. Fish and Wildlife Service.

U.S. Fish and Wildlife Service (USFWS). April 1994. "Recovery Plan for Schweinitz's sunflower (*Helianthus schweinitzii*)."

U.S. Fish and Wildlife Service. January 1997 (USFWS). "Recovery Plan for Carolina Heelsplitter (*Lasmigona decorata*) Lea."

U.S. Fish and Wildlife Service (USFWS), US Department of the Interior. May 1999. "National Wetlands Inventory." NC Center for Geographical Information and Analysis (CGIA) Data Layers.

U.S. Geological Survey (USGS), 1998. "Hydrologic and Water-Quality Data from Mountain Island Lake, NC, 1994-1997." Open File Report 98-549.

Voices and Choices Web site: www.ccchoices.org/esummit